DECISION DOCUMENTATION PACKAGE
COVER SHEET

Prepared in accordance with

TRACK 1 SITES:
GUIDANCE FOR ASSESSING
LOW PROBABILITY HAZARD SITES
AT THE INEEL

Site Description: **Shallow Injection Wells Associated with Fuel Oil Storage Tanks (CPP-701) at INTEC**

Site ID: **CPP-104, CPP-105, CPP-106, CPP-107, CPP-108** **Operable Unit:** **3-13**

Waste Area Group: **3**

I. SUMMARY – Physical description of the site:

In January 2003, Bechtel BWXT Idaho, LLC (BBWI) completed an evaluation of 36 shallow injection wells (SIWs) located at the Idaho National Engineering and Environmental Laboratory (INEEL). This evaluation presented the status and the abandonment plan for each SIW and was approved by the Idaho Department of Water Resources.[1] These 36 SIWs included nine located at the Idaho Nuclear Technology and Engineering Center (INTEC) facility with the abandonment plan to include evaluation under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

To facilitate the evaluation of the SIWs, this Track 1 document evaluates five of the nine SIWs that received similar waste during their operation (see Attachment 1). Specifically, this decision document addresses the SIWs where steam condensate was dispelled from the steam lines used to heat Fuel Oil No. 5 in two above-ground storage tanks (see Attachment 2). This was done to ensure the proper viscosity for transferring the fuel oil and also operating the boiler system in Building CPP-606, the Service Building Powerhouse. The two fuel oil tanks associated with these SIWs are VES-UTI-681 (244,000 gal) and VES-UTI-682 (50,000 gal) and are located near Building CPP-701, the Fuel Oil Loading Station. These two storage tanks reside inside a 15-ft gravel berm. VES-UTI-681 was put into service in 1951, while VES-UTI-682 was put into service in 1960.[2] The fuel oil tanks are still in service today and store a fuel oil type that does not require heating.

Four of the SIWs reside within the berm and in close proximity to the two storage tanks. The other SIW is located south of Building CPP-701 and outside the berm. These SIWs were taken out of service in 1986 due to failure of steam lines and consequently solidification of the fuel oil. During the removal of the solidified fuel, some of the fuel oil was spilled on the ground around the cleanout portal of Tank VES-UTI-682. The stained, gravelly soils had an appearance similar to asphalt. The stained soils were removed from inside the berm in 1986-87, 1997, and 2002.[3] In 1986, the subcontractor removed the visibly contaminated soil around the storage tank. In 1997, it was discovered that not all of the contamination had been cleaned up and additional soil was removed. Lastly, in 2002, the contaminated area was excavated to a depth of about 2 ft, after sampling demonstrated the concentrations of contaminants of concern exceeded the State of Idaho's Risk-Based Corrective Action (RBCA) for Petroleum Releases (RBCA) Tier 0 cleanup levels. A Tier 2 analysis was conducted under RBCA for the fuel oil storage release site, excluding the shallow injection wells.[4] The Tier 2 modeling results demonstrate that the calculated risk does not exceed the RBCA Tier 2 action levels; thus, no further action was recommended and the report was submitted to Idaho Department of Environmental Quality in November 2003.

Based on the evaluation presented in this document, these five SIWs do not pose an unacceptable risk to human health and the environment and a "No Action Required" is the recommended action.

Various names and numbers are used to identify these SIWs. They are identified below by the CERCLA site number, followed by the Record Number – Facility number, the IDWR Record Number, then the well name in parentheses.

CPP-104; 19-CPP; #75; (CPP-701, CPP-701 SI-AT-SB and MAH-FOS-FL-314)

This SIW resides outside the berm and south of Building CPP-701 (see Attachment 3). The SIW is equipped with a metal lid and hinged door. A condensate line, two fuel oil transfer lines, and a high-pressure steam line ran through this SIW and back towards CPP-606. The condensate line exiting this SIW connected into the service waste line coming from Building CPP-644 near Building CPP-606 (see Attachment 4).

CPP-105; 20-CPP; #76; (CPP-701-A, CPP-701-A SI-AT-SB and DVB-FOS-HS-F5)

This SIW resides within the berm and is associated with the 244,000-gal fuel oil tank, VES-UTI-681 (see Attachment 5). It is located on the west side of the fuel tank. This SIW is constructed of concrete and is equipped with a metal lid. The condensate line from the oil tank heater (HE-UTI-622) dispelled condensate into this SIW and connected back into the main condensate line traveling back towards CPP-606.

CPP-106; 21-CPP; #77; (CPP-701-B-1, CPP-701-B FD-AT-SB)

This SIW resides within the berm and is associated with the 50,000-gal fuel oil tank, VES-UTI-682 (see Attachment 6). It is located on the southwest side of the fuel tank. This SIW is constructed of galvanized metal with a metal lid. The condensate line from the oil tank heater (HE-UTI-623) dispelled condensate into this SIW and connected back into the main condensate line traveling back towards CPP-606.

CPP-107; 22-CPP; #78; (CPP-701-B-2, CPP-701-B SI-AT-SB)

This SIW resides within the berm and is associated with the 50,000-gal fuel oil tank, VES-UTI-682 (see Attachment 7). It is located on the northern side of the fuel tank. This SIW is constructed of galvanized metal and has a metal lid. The condensate line from the oil tank heater (HE-UTI-624) dispelled condensate into this well and connected back into the main condensate line traveling back towards CPP-606.

In late 1986, the steam lines failed, causing the solidification of Fuel Oil No. 5 within the VES-UTI-682 tank. A subcontractor removed the solidified fuel from the storage tank and, subsequently, spilled some of the fuel oil on the ground around the cleanout portal and near this SIW. The contaminated soil surrounding this SIW and in the general area of the storage tank was excavated, but noticeable residual fuel oil is visible inside this SIW.

CPP-108; 23-CPP; #79; (CPP-701-B-3, CPP-701-B FD-AT-SB Dry Well)

This SIW resides within the berm and is associated with the 50,000-gal fuel oil tank, VES-UTI-682 (see Attachment 8). It is located on the eastern side of the fuel tank. This SIW is constructed of galvanized metal with a metal lid. The condensate line from the oil tank heater (HE-UTI-625) dispelled condensate into this SIW and connected back into the main condensate line traveling back towards CPP-606. Visual inspection indicated slight soil discoloration; but no releases, other than steam condensate, are documented.

DECISION RECOMMENDATION

II. SUMMARY - Qualitative Assessment of Risk:

The level of reliability for the information collected in this report is moderately to highly reliable.

SIWs CPP-104, -105, -106, and –108 Associated with Steam Condensate

The hazardous substances discharged to the SIWs were identified based on process knowledge. The process knowledge was from interviews with operators that have operated the system since the 1980s and their knowledge of any previous operations data. Actual data records are not available for the early years of operation for the boiler system.

The concentration for the hazardous constituent was conservatively estimated using process knowledge and did not exceed the 1E-06 risk-based concentration value from the EPA Region 9 Preliminary Remediation Goals for screening soil sites and represents a low qualitative risk.

When this information is plotted for the Qualitative Risk and Reliability Evaluation Table for these four shallow injection wells, an intersection in the "No Action Required" portion of the chart is reached.

SIW CPP-107 Associated with Steam Condensate and Fuel Oil Contamination

The hazardous substances discharged to the shallow injection wells were identified based on process knowledge. The concentration for the hazardous constituent associated with the steam condensate was conservatively calculated and did not exceed the 1E-06 risk-based concentration value from the EPA Region 9 Preliminary Remediation Goals for screening soil sites and represents a low qualitative risk.

The fuel oil contaminant concentrations were based on sample results with the majority of the constituents below the 1E-06 risk-based concentration values from the EPA Region 9 Preliminary Remediation Goals for screening soil sites. Three constituents exceeded the 1E-06 risk-based concentration, benzo(a)anthracene, benzo(a)pyrene and benzo(b)fluoranthene, resulting in further evaluation. Therefore, being consistent with the remediation goals provided in the OU 3-13 Final Record of Decision (ROD) for Idaho Nuclear Technology Engineering Center (DOE/ID-10660), the 1E-04 risk-based concentration values were calculated and the fuel oil constituents do not exceed those values.

When this information is plotted on the Qualitative Risk and Reliability Evaluation Table, an intersection in the "No Action Required" portion of the chart is reached for the overall assessment.

III. SUMMARY - Consequences of Error:

False negative error:

The false negative decision error would be to conclude that the contaminated soil remaining below and inside these shallow injection wells poses no unacceptable risk to human health and/or the environment, when in fact it does. This decision would result in no further action being taken at the site when one is warranted. The consequences of this would be fewer controls in place to ensure protection of the public and the environment for the chosen remedial alternative (i.e., no further action), when in fact these controls should be in place. This error is minimized because of on-going monitoring of the perched water. If perched water monitoring indicated contaminant migration, the decision for no further action would be revisited.

False positive error:

The false positive error would be to conclude that the contaminated soil remaining below and inside these shallow injection wells poses an unacceptable risk to human health and/or the environment, when in fact it does not. This type of error is minimized because the data do not indicate that the 1E-04 risk-based levels or HI of1 are exceeded.

IV. SUMMARY - Other Decision Drivers:

CPP-104, -105, -106, and –108 Associated with Steam Condensate

There is minimal risk from leaving the potentially contaminated soil in the ground. Using a conservative analysis, there are no contaminants with concentrations that approach risk levels that would be unacceptable for human health and they are not readily accessible since they reside at a depth of at least 3 ft. Under the OU 3-13 Final Record of Decision, these sites would be classified as "No Further Action".

Current plans indicate INTEC is planned to remain in industrial use until 2095 and will not be available for residential use after that timeframe.

Recommended Action:

The shallow injection wells, CPP-104, -105, -106, and -108 should be classified as "No Action Required" sites. Conservative estimates confirm the steam condensate's hazardous constituent concentration does not exceed EPA Region 9's Preliminary Remediation Goals 1E-06 risk-based concentration value for soil screening.

Shallow Injection Well CPP-107, with fuel oil contamination, should be classified as "No Action Required". The steam condensate constituent is below EPA Region 9's Preliminary Remediation Goals 1E-06 risk-based concentration level for soil screening. The fuel oil contamination constituents are above EPA Region 9's Preliminary Remediation Goals for soil screening but below calculated values using 1E-04 risk-based concentrations, which are consistent with the OU 3-13 ROD risk level for contaminated soil.

Since no action will be taken under CERCLA, these shallow injection wells will be closed under other regulatory programs. Abandonment of these shallow injection wells will be in accordance with the requirements listed in IDAPA 37.03.09.025.012.a.

Signatures:	**# Pages: 67**	**Date:**
Prepared By: Jodi L. Bragassa		**DOE WAG Manager:** Rachel G. Hall
Approved By:		**Independent Review:** ORB Chair

DECISION STATEMENT
(DOE RPM)

Date Received: 4/15/04

Disposition: CERCLA sites CPP-104, 105, 106, 107 and 108 are steam injection wells used to heat fuel oil tanks and transfer lines. The sites require no action. Several corrosion inhibitors were used during operation of the steam boiler system. Fuel oil residues are present in surrounding soils and well depressions but neither corrosion inhibitors nor fuel oil residues are present above the 1E-06 risk-based concentration values from EPA Region 9 Preliminary Remediation Goals.

Date: 4/16/04	# Pages: 67
Name: Kathleen Hain	Signature: Kathleen S Hain

DECISION STATEMENT
(EPA RPM)

Date Received: 4-22-04 (EM-ER-04-079)

Disposition:

Agree No action Required under CERCLA. Close wells as specified by Idaho State regulations

Date: 4-22-04	**# Pages:** 67
Name: Dennis Faulk	**Signature:**

DECISION STATEMENT
(STATE RPM)

Date Received: February 19, 2004

Disposition:

Track 1 Sites: INTEC Injection Wells CPP-104, CPP-105, CPP-106, CPP-107, and CPP-108.

The Idaho Department of Environmental Quality, Waste Management & Remediation Division, has determined, based on information presented in the February 2004 Track 1 Decision Document for the Shallow Injection Wells CP-104, CPP-105, CPP-106, CPP-107, and CPP-108 associated with the Fuel Oil Storage Tanks at INTEC (EM-ER-04-035), that these sites do not pose an unacceptable risk and should be classified "No Action Required" under the FFA/CO program.

These shallow injection wells will be closed and therefore subject to abandonment procedures under the Idaho Department of Water Resources (IDWR) regulation IDAPA 37.03.09.025.012.a. Conformance with abandonment procedures will be noted during subsequent five-year CERCLA reviews of OU 3-13. The remedial decision for these sites will be documented in a future INEEL Record of Decision.

Date: April 27, 2004	# Pages: 67
Name: Daryl F. Koch	Signature: Daryl F. Koch

PROCESS/WASTE WORKSHEET
ID: CPP-104/105/106/107/108

Col 1 Processes Associated With this Site	Col 2 Waste Description & Handling Procedures	Col 3 Description & Location of any Artifacts/Structures/Disposal Areas Associated with this Waste or Process
(CPP-104) Steam condensate release for main condensate line from fuel oil tanks.	Steam condensate was dispelled to the SIW through a 2-in. line (CTN-101676).	**Artifact:** The SIW is a manhole approximately 12 ft deep and fitted with a hinged metal lid (MAH-FOS-FL-314). **Location:** It is located south of Building CPP-701 outside the berm. **Description:** The SIW received steam condensate through a 2-in. condensate line. This condensate line was the main line connected to the individual condensate lines coming from the tank heaters. The operational life of this well was from approximately 1972 until 1986.
(CPP-105) Steam condensate release for Fuel Tank VES-UTI-681's heating system.	The steam condensate was dispelled to the SIW through a ¾-in. line (CTN-101681).	**Artifact:** The SIW is concrete and equipped with a metal lid. This well is approximately 5 ft deep. **Location:** It is located west of Fuel Tank VES-UTI-681 inside the berm. **Description:** The SIW received steam condensate from the fuel tank's heating unit, through a ¾-in. condensate line, during its operational life of 1951 to 1986.
(CPP-106) Steam condensate release for Fuel Tank VES-UTI-682's heating system.	The steam condensate was dispelled to the SIW through a ¾-in. line (CTN-101678).	**Artifact:** The SIW is galvanized metal with a metal lid and is approximately 3 ft deep. **Location:** It is located southwest of the Fuel Tank, VES-UTI-682, inside the berm. **Description:** The SIW received steam condensate from one of the fuel tank's heating units, through a ¾-in. condensate line, during its operational life of 1960 to 1986.

(CPP-107) Steam condensate release for Fuel Tank VES-UTI-682's heating system.	The steam condensate was dispelled to the SIW through a 1-in. line (CTN-101676).	**Artifact:**	The SIW is galvanized metal with a metal lid and is approximately 3 ft deep.
		Location:	It is located southwest of the Fuel Tank, VES-UTI-682, inside the berm.
		Description:	The SIW received steam condensate from one of the fuel tank's heating units, through a ¾-in. condensate line, during its operational life of 1960 to 1986. Residual fuel oil is present in the SIW.
(CPP-108) Steam condensate release for Fuel Tank VES-UTI-682's heating system.	The steam condensate was dispelled to the SIW through a ¾-in. line (CTN-101677).	**Artifact:**	The SIW is galvanized metal with a metal lid and is approximately 3 ft deep.
		Location:	It is located east of the fuel oil tank, VES-UTI-682, inside the berm.
		Description:	The SIW received steam condensate from one of the fuel tank's heating units, through a ¾-in. condensate line, during its operational life of 1960 to 1986. Discolored soil is present in the well.

CONTAMINANT WORKSHEET

SITE ID: CPP-104/105/106/107/108

PROCESS: Steam condensate release for Fuel Oil Storage Tanks **WASTE:** Steam condensate constituents and Fuel Oil No. 5

Key: ca = cancer PRG, nc = noncancer PRG (HQ=1)

Col 4 What Known/Potential Hazardous Substance/Constituents Are Associated with this Waste or Process?	Col 5 Potential Sources Associated with this Hazardous Material	Col 6 Known/Estimated Concentration of Hazardous Substances/ Constituents (mg/kg)	Col 7 Risk-based Concentration (mg/kg)[a] $1X10^{-6}$	$1X10^{-4}$	Col 8 Qualitative Risk Assessment based on risk of 1E-04 (hi/med/low)	Col 9 Overall Reliability (high/med/low)
cyclohexylamine	corrosion inhibitor added to steam boiler system	CPP-104 – not applicable CPP-105 – 1,882[b] CPP-106 – 1,138[b] CPP-107 – 1,138[b] CPP-108 – 1,138[b] **(calculations are provided in Question 6)**	1.2E+04 nc		Low	High
benzene[d]	soil	< 5 ug/kg	6.0E-01 ca (10^{-6})	6.0E+01 ca (10^{-4})	Low	High
tolulene[d]	soil	< 5 ug/kg	5.2E+02 ca (10^{-6})	5.2E+04 ca (10^{-4})	Low	High
ethylbenzene[d]	soil	< 5 ug/kg	8.9E+00 ca (10^{-6})	8.9E+02 ca (10^{-4})	Low	High
Xylene (mixed)[d]	soil	< 5 ug/kg	2.7E+02 ca (10^{-6})	2.7E+04 ca (10^{-4})	Low	High
Benzo(a)anthracene[d]	soil	6.5E-01	6.2E-01 ca (10^{-6})	6.2E+01 ca (10^{-4})	Low	High

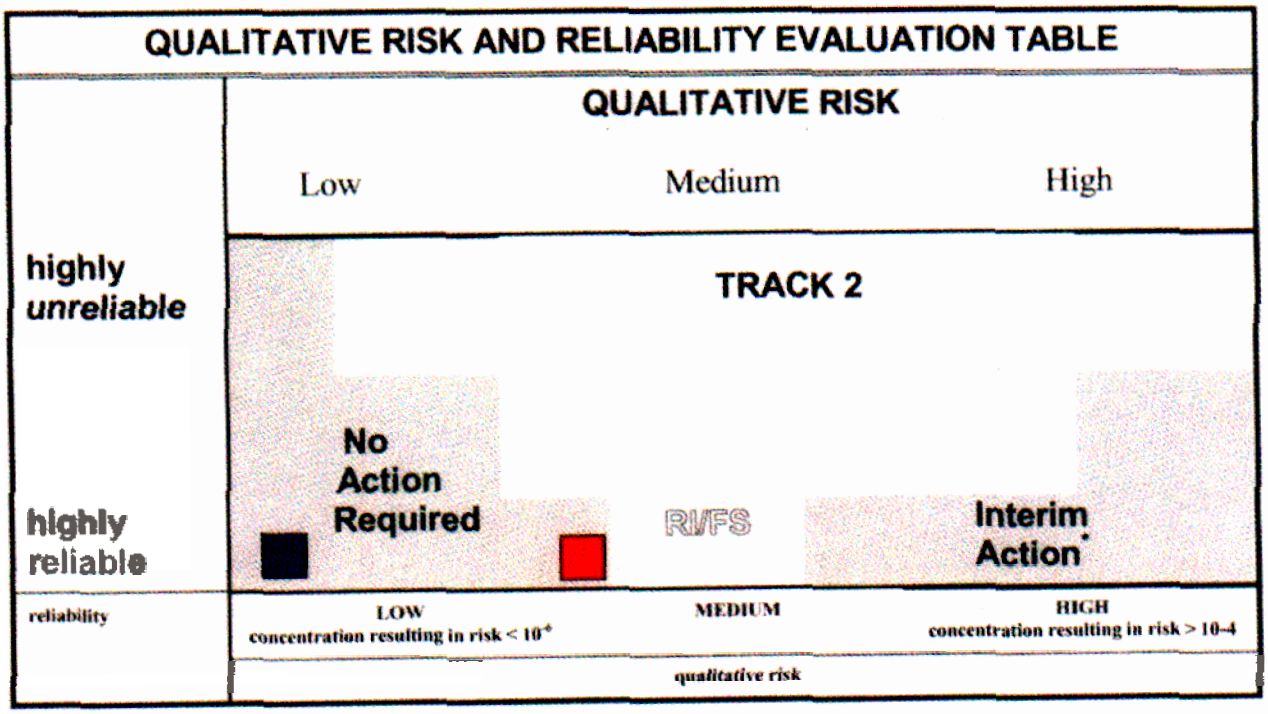
Benzo(a)pyrene[d]	soil	2.7E+00	6.2E-02 ca (10^{-6})	6.2E+00 ca (10^{-4})	Low	High
Benzo(b)fluoranthene[d]	soil	4.9E+00	6.2E-01 ca (10^{-6})	6.2E+01 ca (10^{-4})	Low	High
Chrysene[d]	soil	3.2E+00	6.2E+01 ca (10^{-6})	6.2E+03 ca (10^{-4})	Low	High
acenaphthene[d]	soil	3.1E+01	-		Low	High
Anthracene[d]	soil	2.8E-01 J[c]	2.2E+04 nc		Low	High
Benzo(g,h,i)perylene[d]	soil	1.3E+00	-		Low	High
Benzo(f)fluoranthene[d]	soil	3.7E+00	-		Low	High
Flouranthene[d]	soil	5.9E+00	8.2E+07 nc		Low	High
Fluorene[d]	soil	1.4E+00	2.3E+04 nc		Low	High
Naphthalene[d]	soil	< 670 ug/kg	2.3E+04 nc		Low	High
Phenanthrene[d]	soil	7.1E-01	-		Low	High
Pyrene[d]	soil	1.6E+00	2.3E+03 nc		Low	High

a. Risk-based concentration limits are taken from the EPA Region 9 Preliminary Remediation Goals table. The table provides values for soil under the residential land-use scenarios.

b. The estimated concentration is based on the constituent percentage in the boiler system product for the throughput of the boiler system (14.4 gal/year). Four hundred gallons of Amercor 1848, a corrosion inhibitor, are used in the system each year.

c. Analyzed sample was "J" flagged and is an estimated value.

d. Hazardous constituents associated with fuel oil release and only present in SIW CPP-107.



- Risk from contaminants associated with shallow injection well CPP-107 soils
- Risk from contaminants associated with shallow injection wells CPP-104, -105, -106, and -108 soils

PROCESS: Shallow Injection Wells Associated with Fuel Oil Storage Tanks

Question 1. What are the waste generation processes, locations, and dates of operation associated with this site?

Block 1 Answer:

There are currently no waste generation processes associated with these SIWs. The SIWs were in service to receive steam condensate from approximately 1951 and 1960 until 1986 when the steam lines failed and the type of fuel oil used in the boiler system was changed from Fuel Oil No. 5 to Fuel Oil No. 2. Since Fuel Oil No. 2 does not require heating, the steam and condensate lines were disconnected outside CPP-606 and abandoned.

These steam lines were closed-loop systems used to heat Fuel Oil No. 5 to prevent solidification.[5] In late 1986, the steam lines failed, causing the solidification of the Fuel Oil No. 5. While removing the solidified fuel oil in 1986-87, a subcontractor spilled some of the fuel oil on the ground around the cleanout portal of Tank VES-UTI-682 and near SIW CPP-107. The subcontractor removed the visibly contaminated soil around the storage tank at that time. In 1997, it was discovered that not all of the contamination had been cleaned up and additional soil was removed. Subsequent soil removal was also conducted in 2002, the contaminated soil was excavated to a depth of about 2 ft in the stained areas and sampling was conducted. Noticeable residual fuel oil, associated with this spill, is visible inside SIW CPP-107. There is also some slight soil discoloration inside SIW CPP-108; however analysis has not been done to confirm the source. This discoloration does not resemble fuel oil.

INTEC Steam Process System

The only waste-generating process associated with each SIW was INTEC's steam heating system. The constituent used in the INTEC boiler system prior to the 1980s was trisodium phosphate. After the 1980s and currently, Amersite 2 (corrosion inhibitor); Advantage Plus 1400 (deposit inhibitor), along with trisodium phosphate; and Amercor 1848 (corrosion inhibitor) are used in the system. The current boiler system operators reported that, to the best of their knowledge, chromates were not used during operation of the system (see Attachments 9 and 10). In addition, a brine solution with 10% brine concentration is used in the water softener system.[6]

During operation of the boiler system, only the corrosion inhibitor constituents end up in the condensate. The deposit inhibitor stays in the boiler and is flushed down the service waste line after the system is cleaned. Per the material safety data sheets contained in Attachment 12, Amersite 2 contains sodium metabisulfite (30–40%). Amercor 1848 contains cyclohexylamine (10–25%), diethylethanolamine (10–25%), and morpholine (10–25%). Advantage Plus 1400 contains ethylenediamine tetraacetic acid Na salt (1-10%), acrylic polymer (1-10%), sodium lignosulfonate (1-10%), and organic salt (1-10%). None of the chemicals, except cyclohexylamine are on the EPA Region IX Preliminary Remediation Goals table.[7] This table provides the risk-based concentrations for soils under residential and industrial land-use scenarios. The residential land-use values were used.

Approximately 400 gal of each corrosion inhibitor product are used in the system each year.[8] The system processes 120 million lb of steam each year to heat the various INTEC facilities. Using the water weight conversion factor of 8.33 lb/gal, the system would produce 14.4 million gal of condensate each year.

Block 2 How reliable are the information sources? ☒ High ☐ Med ☐ Low (check one) Explain the reasoning behind this evaluation.

Existing design drawings, physical walk-downs of the site, documentation, and personal interviews with site personnel provide consistency supporting the reliability of this evaluation. Interviews with personnel

intimately familiar with the boiler system provided the information on the products used in the system as corrosion and deposit inhibitors. The personnel have been familiar with the process starting in the 1980s.

Block 3 Has this INFORMATION been confirmed? ☒ Yes ☐ No (check one)
If so, describe the confirmation.

This information was confirmed through walk-downs of the site and by interviewing personnel with knowledge of the area and incidences that occurred. Because of the consistencies between all information collected, this information was deemed true and accurate. Engineering drawings confirm the SIWs and the processes associated with the wells, along with operating personnel knowledge. Therefore, this information is considered highly reliable.

Block 4 Sources of Information [check appropriate box(es) & source number from reference list]

No available information	☐	**Analytical data**	☐
Anecdotal	☐	**Documentation about data**	☐
Historical process data	☐	**Disposal data**	☐
Current process data	☐	**Q.A. data**	☐
Photographs	☐	**Safety analysis report**	☐
Engineering/site drawings	☒ **Att 11**	**D&D report**	☐
Unusual Occurrence Report	☐	**Initial assessment**	☐
Summary documents	☒ **1,2,3,7**	**Well data**	☐
Facility SOPs	☐	**Construction data**	☐
OTHER	☒ **5,6,8**		

PROCESS: Shallow Injection Wells Associated with Fuel Oil Storage Tanks

Question 2. What are the disposal processes, locations, and dates of operation associated with this site? How was the waste disposed?

Block 1 Answer:

Steam Condensate

There are currently no disposal processes associated with these SIWs. The steam condensate disposal process locations generated from the steam coils that ran through Fuel Storage Tanks VES-UTI-681 and VES-UTI-682 were SIWs CPP-104, -105, -106, -107, and –108. Three of these SIWs (CPP-106, -107, and -108) are located around Tank VES-UTI-682 and were in service from 1960 to 1986. One SIW (CPP-105) is located on the west side of Tank VES-UTI-681 and was in service from 1951 to 1986. The last SIW is located on the south side of building CPP-701 and was in service from approximately 1972 until 1986.

Steam condensate from the closed-loop steam lines was discharged into the SIWs. Steam condensate from heating coils within the VES-UTI-682 tank were discharged into SIWs CPP-106, -107, and –108. Condensate from heating coils within the VES-UTI-681 tank was discharged into SIW CPP-105. All four of the condensate lines from these SIWs flowed back into the main condensate line that dispelled into SIW CPP-104 (see Attachment 11).

Steam condensate waste was reported to have contained water and minute chemical additives to prevent corrosion build-up in the steam system. It was reported that it is highly unlikely that any fuel oil made its way into the steam condensate. This is due to the following: the steam traveled through a closed system, the steam was pressure-driven (positive pressure in the lines), if there was a leak, the fuel would have been compromised by the introduction of water, and there are no reports of water contaminating the fuel.

Fuel Oil Contamination

The closed-loop steam lines were used to heat Fuel Oil No. 5 to prevent it from solidifying. In late 1986, the steam lines failed, causing the solidification of the Fuel Oil No. 5 within the tanks. The solidified fuel was removed from the tanks by a subcontractor, who subsequently spilled some of the fuel oil on the ground around the cleanout portal of Tank VES-UTI-682. In 1986, the subcontractor removed the visibly contaminated soil around the storage tank. In 1997, it was discovered that not all of the contamination had been cleaned up and additional soil was removed. Lastly, in 2002, the contaminated area was excavated to a depth of about 2 ft, after sampling demonstrated the concentrations of contaminants of concern exceeded the State of Idaho's RBCA Tier 0 cleanup levels, and confirmation sampling was conducted. Currently, a Tier 2 analysis is being conducted under RBCA for the fuel oil storage release site, excluding the shallow injection wells. The Tier 2 modeling results demonstrate that the calculated risk is lower than the RBCA Tier 2 action levels, thus no further action is recommended. All soils excavated from the fuel oil release site were disposed in the Radioactive Waste Management Complex as low-level waste. The radioactivity levels in the soil were above background but did not exceed the OU 3-13 ROD remediation goals. The radioactivity was presumed to be from windblown contamination and unrelated to the petroleum release. Sampling performed in 1987 determined that the fuel oil sludge was not a RCRA hazardous waste.[9]

After the tanks were emptied and cleaned, they were filled with Fuel Oil No. 2. Because of its properties, Fuel Oil No. 2 does not require heat to prevent it from solidifying; thus, the steam and condensate lines were disconnected and abandoned. Fuel Oil No. 2 has been stored in the two tanks from 1986 to present.

Block 2 **How reliable are the information sources? ☒ High ☐ Med ☐ Low (check one)**
Explain the reasoning behind this evaluation.

Existing design drawings, physical walk-downs of the site, documentation, and personal interviews with site personnel provide consistency supporting the reliability of this evaluation.

Block 3 **Has this INFORMATION been confirmed? ☒ Yes ☐ No (check one)**
If so, describe the confirmation.

This information was confirmed by interviewing personnel with knowledge of the area and incidences that occurred. Also, walk-downs of the area and viewing inside the SIWs confirmed that fuel was present in SIW CPP-107. Viewings inside the other SIWs provided no visual evidence of fuel oil contamination. Because of the consistencies between all information collected, this information was deemed reliable.

Block 4 ***Sources of Information [check appropriate box(es) & source number from reference list]***

No available information	☐	**Analytical data**	☐
Anecdotal	☐	**Documentation about data**	☐
Historical process data	☒ 5	**Disposal data**	☐
Current process data	☐	**Q.A. data**	☐
Photographs	☐	**Safety analysis report**	☐
Engineering/site drawings	☒ Att 11	**D&D report**	☐
Unusual Occurrence Report	☐	**Initial assessment**	☐
Summary documents	☒ 2,9	**Well data**	☐
Facility SOPs	☐	**Construction data**	☐
OTHER	☐		

PROCESS: Shallow Injection Wells Associated with Fuel Oil Storage Tanks

Question 3. Is there evidence that a source exists at this site? If so, list the sources and describe the evidence.

Block 1 Answer:

Steam Condensate

There is no formal evidence that a source exists at these sites for the steam condensate discharge. Conservative estimates of contaminant concentrations in the soil are based on process knowledge and are below risk-based levels. Additionally, the steam and condensate lines are no longer used and have been abandoned.

Fuel Oil Contamination

Fuel oil contamination is present in SIW CPP-107 and has been confirmed both visually and with sample data. Sampling occurred under the Risk-Based Corrective Action Tier 2 analysis for the fuel oil release. Sample results pertaining to SIW CPP-107 are reported in the contaminant worksheet. Additionally, no soil removal activities have been performed on the SIWs.

Block 2 How reliable are the information sources? ☒ High ☐ Med ☐ Low (check one) Explain the reasoning behind this evaluation.

The information regarding the contamination sources of each SIW is well-documented and is considered highly reliable. Reliability of the estimates for the steam condensate contaminant concentrations in the soil is high because conservative estimates were used based on process knowledge.

Block 3 Has this information been confirmed? ☒ Yes ☐ No (check one) If so, describe the confirmation.

Visual examination by regulatory personnel and sample results have confirmed the existence of fuel oil contamination in SIW CPP-107.

Block 4 Sources of information [check appropriate box(es) & source number from reference list]

No available information	☐	**Analytical data**	☒ **15**
Anecdotal	☐	**Documentation about data**	☐
Historical process data	☐	**Disposal data**	☐
Current process data	☐	**Q.A. data**	☐
Photographs	☐	**Safety analysis report**	☐
Engineering/site drawings	☐	**D&D report**	☐
Unusual Occurrence Report	☐	**Initial assessment**	☐
Summary documents	☒ **9**	**Well data**	☐
Facility SOPs	☐	**Construction data**	☐
OTHER	☐		

PROCESS: Shallow Injection Wells Associated with Fuel Oil Storage Tanks

Question 4. Is there empirical, circumstantial, or other evidence of migration? If so, what is it?

Block 1 Answer:

Steam Condensate

By its nature, the condensate released to the SIWs would have migrated downward. No soil data are available; however, conservative estimates of soil concentrations based on process knowledge indicate that the soil would not exceed risk-based concentrations at the source; therefore, migration above risk-based levels is also unlikely.

Fuel Oil Contamination

No evidence exists for migration of fuel oil in the SIW. In a separate program, residual fuel oil that was spilled on the ground from VES-UTI-682 was excavated and removed. The soil was excavated to a depth of approximately 2 ft and is being reviewed for closure under Risk-Based Corrective Action Tier 2. It is unlikely that the fuel oil migrated from the SIW or to groundwater because of its high viscosity and because it forms a hardened, asphalt-like material where it is released to soil.[10]

Block 2 How reliable are the information sources? ☒ High ☐ Med ☐ Low (check one)
Explain the reasoning behind this evaluation.

In review of groundwater monitoring records from the INEEL Environmental Data Warehouse, there is no evidence of contamination from the steam condensate constituent at the source migrating to the perched water.[11] The constituent's estimated concentration is well below EPA's Region 9 Preliminary Remediation Goals for screening soil at the source; however, no actual sample data are available.

The assumed lack of migration of fuel oil in SIW CPP-107 is derived from the cleanup efforts surrounding the fuel oil contaminated soil near VES-UTI-682 and is documented in the report titled "CPP-701 Fuel Oil Storage Area Risk-Based Corrective Action Tier 2 Analysis for Petroleum Contaminated Soils" (see Reference 2).

Block 3 Has this information been confirmed? ☒ Yes ☐ No (check one)
If so, describe the confirmation.

Groundwater monitoring records from the INEEL Environmental Data Warehouse confirm the absence of this contaminant, cyclohexylamine in the perched water. The Environmental Data Warehouse stores information related to well samples including composite samples taken from multiple wells.

Sampling data from the cleanup of the fuel oil spill near VES-UTI-682 suggest that contamination from the spill extended no deeper than 4 ft.

Block 4 Sources of Information [check appropriate box(es) & source number from reference list]

No available information	☐	**Analytical data**	☐
Anecdotal	☐	**Documentation about data**	☐
Historical process data	☐	**Disposal data**	☐
Current process data	☐	**Q.A. data**	☐
Photographs	☐	**Safety analysis report**	☐
Engineering/site drawings	☐	**D&D report**	☐

Unusual Occurrence Report	☐	**Initial assessment**	☐
Summary documents	☒ 10	**Well data**	☒ 11
Facility SOPs	☐	**Construction data**	☐
OTHER	☒ 2		

PROCESS: Shallow Injection Wells Associated with Fuel Oil Storage Tanks

Question 5. Does site operating or disposal historical information allow estimation of the pattern of potential contamination? If the pattern is expected to be a scattering of hot spots, what is the expected minimum size of a significant hot spot?

Block 1 Answer:

Steam Condensate

These SIWs received the steam condensate from the fuel oil storage tanks' heating system. The discharges were released to the SIWs and would have dissipated into the soil beneath the wells, moving downward towards bedrock. Historical information does not allow estimation of the pattern of potential contamination; however, as identified in Question #6, the contaminant concentration based on process knowledge is estimated to be below the 1E-06 risk-based concentrations in EPA Region 9 Preliminary Remediation Goals for soil screening.

Fuel Oil Contamination

The site operating and historical information allows estimation of the pattern of potential contamination. The estimated contamination pattern is provided in Question #6.

Block 2 How reliable are the information sources? ☐ High ☒ Med ☐ Low (check one) Explain the reasoning behind this evaluation.

The estimated contaminant concentration for the steam condensate is based on actual operating processes. Additionally, conservative figures were used to evaluate the total volume of condensate that would have been dispelled into each SIW. The total volume figure assumed no condensate recovery, evaporation or biodegradation of the constituent, and all the condensate was dispelled to the SIWs.

Data for contaminants from the fuel oil spill in SIW CPP-107 are reliable because analytical information for samples collected at the base of the SIW were obtained.

Block 3 Has this information been confirmed? ☐ Yes ☒ No (check one) If so, describe the confirmation.

Visual inspection of this area confirms that the casing is 3 ft in diameter; however, the depth of the contamination has not been confirmed but is believed to be no deeper than 4 ft based on cleanup efforts previously performed for the contaminated soil.

No information that documents the daily release of steam condensate is available.

Block 4 Sources of Information [check appropriate box(es) & source number from reference list]

No available information	☐	**Analytical data**	☒ **15**
Anecdotal	☐	**Documentation about data**	☐
Historical process data	☐	**Disposal data**	☐
Current process data	☐	**Q.A. data**	☐
Photographs	☒ **Att 3,5,6,7,8**	**Safety analysis report**	☐

Engineering/site drawings	☒ **Att 11**	**D&D report**	☐
Unusual Occurrence Report	☐	**Initial assessment**	☐
Summary documents	☒ **9**	**Well data**	☐
Facility SOPs	☐	**Construction data**	☐
OTHER	☐		

PROCESS: Shallow Injection Wells Associated with Fuel Oil Storage Tanks

Question 6. Estimate the length, width, and depth of the contaminated region. What is the known or estimated volume of the source? If this is an estimated volume, explain carefully how the estimate was derived.

Block 1 Answer:

The estimated length, width, and depth of contaminated regions are based on the ground surface dimensions of the SIWs and migration to a depth of 10 ft, the residential basement scenario. The contamination zones will be either a cone-shaped or right-pyramid-shaped area under the SIW. A migration slope of 1 ft vertical to 1 ft horizontal was assumed. The following calculations for each SIW are used to determine the worst-case scenario. The worst-case scenario is that all condensate dispelled over the operational period of the steam lines for heating the associated fuel oil was contained in each contamination zone (i.e., the volume was not split amongst the five wells operating at that time), also see Question 7. The operational period of the steam lines used for the calculation is the longest operational period of 35 years (assumes in service date of 1951). The calculations below provide an estimate of the contaminant concentration for each contamination zone with all the system's condensate being dispelled to that zone.

For SIW CPP-107, the assumption is that the fuel oil contamination extends no deeper than 4 ft, based on the excavation of fuel oil contaminated soils surrounding this well performed under a separate program.

Shallow Injection Well CPP-104 (cyclohexylamine contamination)

This SIW is approximately 12 ft deep and fitted with a hinged metal lid. Since this SIW is below the residential scenario (10 ft bgs) the contaminant concentration was not estimated. Additionally, groundwater monitoring records from the INEEL Environmental Data Warehouse confirm the absence of this contaminant, cyclohexylamine in the perched water. However, based on the calculations for the other SIWs, it is shown that the level of the contaminant is not above the risk-based concentration when all the condensate from heating the fuel is dispelled to any one well.

Shallow Injection Well CPP-105 (cyclohexylamine contamination)

(1) Calculate the volume of the soil in the right-pyramid-shaped area in kilograms:

- Assume right-pyramid-shaped contamination zone with the top measuring approximately 2 ft wide by 5 ft long, a bottom measuring 12 ft wide by 15 ft long, and 5 ft in height (1:1-ft slope down to 10 ft bgs, zone starts approximately 5 ft bgs)
- Calculate volume of the area using the ABE Volume Calculator[12] = 387 ft^3
- Convert cubic feet to cubic centimeter
  387 ft^3 = 10.96 m^3 or 10,958,619 cm^3
- Calculate grams assuming dry bulk soil density = 1.5 g/cm^3
  (10,958,619 cm^3)(1.5 g/cm^3) = 16,437,928 g
- Convert to kilograms:
  16,437,928/1000 = **16,438 kg**

(2) Calculate mass in grams of condensate volume:

- Calculate the condensate volume per year with approximately 1,350,000 gal for the 35-year operational life (longest operating period for the two tanks), also see Question 7:
  1,350,000 gal/ 35 years = **38,571 gal/year**

- Then calculate the percentage of condensate volume based on INTEC's boiler system volume per year to determine the volume of condensate attributed to this system. The equation is the total condensate volume (gal/yr) / boiler system output (gal/yr):
  38,571 gal/14,400,000 gal = .0027 = **.27%**

- Next, calculate the contaminant constituent volume used in the INTEC boiler system per year. The constituent represents a wt% of 10–25% of the corrosion inhibitor product. The higher (25%) was used for this calculation. The equation is the total gallons of the corrosion inhibitor product used per year times the wt% of the constituent in the product:
  (400 gal)(.25) = 100 gal

- In order to calculate the number of grams of the constituent used in the INTEC boiler system, the equation is the density of the constituent (referenced in the MERCK Index, 12th Edition[13]) times the volume of the constituent times the number of cubic centimeters in a gallon:
  (density of constituent)(volume of constituent)(cm^3 per gallon)
  (0.8647 g/cm^3)(100 gal)(3785.4 cm^3/gal) = **327,324 g**

- Calculate the milligrams per year of the constituent based on the percentage volume of condensate times the number of grams of the constituent used in the INTEC boiler system:
  (.0027)(327,324) = 883 g/yr or **883,774 mg/yr**

(3) Calculate the total concentration of the constituent in the contamination zone. The formula is the grams of constituent per year times the number of operating years divided by the volume of the soil:
(883,774 mg)(35 years)/16,438 kg = **1,882 mg/kg**

The risk-based concentration level is 12,000 mg/kg for a Hazard Index of 1; therefore, calculate the ratio of the calculated concentration of the constituent divided by the risk-based concentration level.

1,882 mg/kg/12,000 mg/kg = .156 or less than the Hazard Index of 1 and does not pose a risk.

Shallow Injection Wells CPP-106, -107, and –108 (cyclohexylamine contamination)

(1) Calculate the volume of the soil in the cone-shaped area in kilograms:

- Assume cone-shaped contamination zone with the cone being 3 ft at top, 17 ft at bottom, and 7 ft in height (1:1-ft slope down to 10 ft bgs, zone starts at 3 ft bgs)

- Calculate the volume of the cone area using the ABE Volume Calculator = 640 ft^3

- Convert cubic feet to cubic centimeters
  640 ft^3 = 18.12 m^3 or 18,122,105 cm^3

- Calculate grams assuming dry bulk soil density = 1.5 g/cm^3
  (18,122,105 cm^3)(1.5 g/cm^3) = 27,183,157 g

- Convert to kilograms:
  27,183,157/1,000 = **27,183 kg**

(2) Calculate mass in grams of condensate volume:

- Calculate the condensate volume per year, range was approximately 1,350,000 for the 35-year operational life (longest operating period for the two tanks):
  1,350,000 gal/ 35 years = **38,571 gal/year**

- Then calculate the percentage of condensate volume based on INTEC's boiler system volume per year to determine the volume of condensate attributed to this system. The equation is the total condensate volume (gal/yr) / boiler system output (gal/yr):

38,571 gal/14,400,000 gal = .0027 = **.27%**

- Next, calculate the contaminant constituent volume used in the INTEC boiler system per year. The constituent represents a wt% of 10–25% of the corrosion inhibitor product. The higher (25%) was used for this calculation. The equation is the total gallons of the corrosion inhibitor product used per year times the wt% of the constituent in the product:
  (400 gal)(.25) = 100 gal
- In order to calculate the number of grams of the constituent used in the INTEC boiler system, the equation is the density of the constituent (referenced in the MERCK Index, 12th Edition) times the volume of the constituent times the number of cubic centimeters in a gallon:
  (density of constituent)(volume of constituent)(cm^3 per gallon)
  (0.8647 g/cm^3)(100 gal)(3,785.4 cm^3/gal) = **327,324 g**
- Calculate the milligram per year of the constituent based on the percentage volume of condensate times the number of grams of the constituent used in the INTEC boiler system:
  (.0027)(327,324) = 883 g/yr or **883,774 mg/yr**

(3) Calculate the total concentration of the constituent in the contamination zone. The formula is the milligrams of constituent per year times the number of operating years divided by the volume of the soil in the contamination zone:
(883,774 mg)(35 years)/27,183 kg = **1,138 mg/kg**

The risk-based concentration level is 12,000 mg/kg for a Hazard Index of 1; therefore, calculate the ratio of the calculated concentration of the constituent divided by the risk-based concentration level.

1,138 mg/kg /12,000 mg/kg = .095 or less than the Hazard Index of 1 and does not pose a risk.

Shallow Injection Well CPP-107 (fuel oil #5 contamination)

The source of contamination stems from when solidified fuel was removed from Tank VES-UTI-682 by a subcontractor, who subsequently spilled some of the fuel oil on the ground around the cleanout portal. This spill has been cleaned up, but noticeable residual fuel oil is present in this SIW. Sample results of soil from this well are included in the contaminant worksheet included in this Track 1 Investigation.

The estimated length, width, and depth of soil contamination with Fuel Oil No. 5 is a cone-shaped area, with a 3-ft diameter circle on top, an 11-ft diameter circle at the bottom, and a depth of approximately 4 ft.

Block 2 How reliable are the information sources? ☒ High ☐ Med ☐ Low (check one)
Explain the reasoning behind this evaluation.

The EPA Region 9 PRGs tables are widely used for soil contamination remediation and an INEEL approved off-Site laboratory analyzed the samples.

Block 3 Has this INFORMATION been confirmed? ☐ Yes ☒ No (check one)
If so, describe the confirmation.

No verified analytical data are available from any of the SIWs in regard to cyclohexylamine; however, data results for the Fuel Oil No. 5 contaminants have been collected.

Block 4 Sources of Information [check appropriate box(es) & source number from reference list]			
No available information	☐	Analytical data	☒ 15
Anecdotal	☐	Documentation about data	☐
Historical process data	☐	Disposal data	☐
Current process data	☐	Q.A. data	☐
Photographs	☐	Safety analysis report	☐
Engineering/site drawings	☐	D&D report	☐
Unusual Occurrence Report	☐	Initial assessment	☐
Summary documents	☐	Well data	☐
Facility SOPs	☐	Construction data	☐
OTHER	☒ 12,13		

PROCESS: Shallow Injection Wells

Question 7. What is the known or estimated quantity of hazardous substance/constituent at this source? If the quantity is an estimate, explain carefully how the estimate was derived.

Block 1 Answer:

Fuel Oil Contamination in SIW CPP-107

The quantities of constituents derived from the fuel oil spill in 1986 and found in SIW CPP-107 are summarized in the previous contaminant worksheet. The values listed are the greater concentration of two samples collected from the bottom of this SIW. There are no visual signs of fuel oil in any of the other SIWs. It was reported that it is highly unlikely that any fuel oil made its way into the steam condensate. This is due to the following: the steam traveled through a closed system, the steam was pressure-driven (positive pressure in the lines), if there was a leak, the fuel would have been compromised by the introduction of water, and there are no known reports of water contaminating the fuel.

Steam Condensate Contamination

The estimated concentration for hazardous constituent cyclohexylamine was calculated in Question #6 and reported on the contaminant worksheet, Column 6. The cyclohexylamine constituent concentration estimate for Wells CPP-106, -107, and -108, associated with Tank VES-UTI-682, is 1,138 mg/kg. The cyclohexylamine concentration estimate for Well CPP-105, associated with Tank VES-UTI-681, is 1,882 mg/kg. The estimated concentrations are based on the throughput of the boiler system used to heat the fuel oil and assumed all condensate discharge went to each shallow injection well and was not split amongst the operating wells, which provides a very conservative estimate for each SIW.

Fuel Oil Heating Methodology:

For the fuel oil, the heat required to assure delivery of 150° to the boiler system year round as reported by the boiler system engineer[14] was calculated and presented on the following page. The calculation methodology was to heat the fuel oil flow stream upon exiting the storage tanks. Using this information, along with daily average temperatures from NOAA for the site, steam tables for latent heat data at 150 psi (supply), and other assumptions including, but not limited to, all of the steam (turned condensate) went to the shallow injection well, the total life-cycle condensate load was calculated for the system.

$pph_{condensate} = (gpm_{diesel} * SpecificGravity_{diesel} * SpecificHeat_{diesel} * TempRise_{diesel} * 60 * 8.3) / SteamEnthalpy_{150psig}$

steam/condensate from boiler

ppy_{steam}	pph_{steam}	ppm_{steam}	$gpy_{condensate}$	Steam Enthalpy$_{150psig}$ btu/lb
120,000,000	13,699	228	14,457,831	1196

diesel

lbs_{steam} / g_{diesel}	gpy_{diesel}	gph_{diesel}	gpm_{diesel}
118	1,016,949	116	1.93

condensate from VES-UTI-681/682

total 35 year $gallons_{condensate}$	$gpy_{condensate}$	$ppy_{condensate}$	$pph_{condensate}$	sg-d	sh-d	dt-d
1,339,567	38,273	317,669	36	0.88	0.47	110

Given:	Calculated:	Properties:	Assumption:
ppy_{steam}	pph_{steam}	$SteamEnthalpy_{150psig}$	dt-d
	ppm_{steam}	lbs_{steam} / g_{diesel}	
	$gpy_{condensate}$	sg-d	
	gpy_{diesel}	sh-d	
	gph_{diesel}		
	gpm_{diesel}		
	total $gallons_{condensate}$		
	$ppy_{condensate}$		
	$pph_{condensate}$		
	gpm_{diesel}		

Block 2 How reliable are the information sources? ☐ High ☒ Med ☐ Low (check one)
Explain the reasoning behind this evaluation.

The information obtained for all constituents other than cyclohexylamine are based on actual sample results.

The yearly volumes for the corrosion inhibitor product (400 gal) and the boiler system (14,400,000 gal) are based on actual process data supplied by the operating engineer; however, the calculations for the estimated volume of condensate dispelled during the lifetime of each building were calculated using very conservative assumptions.

Block 3 Has this INFORMATION been confirmed? ☒ Yes ☐ No (check one)
If so, describe the confirmation.

The information obtained for all constituents other than cyclohexylamine are based on actual sample results. Interviews with the boiler system's current operating engineer were conducted to ascertain information on the system. No information documenting the quantity of condensate released to each shallow injection well is available.

Block 4 Sources of Information [check appropriate box(es) & source number from reference list]

No availabte information	☐	Analytical data	☒ 15
Anecdotal	☐	Documentation about data	☐
Historical process data	☒ 14	Disposal data	☐
Current process data	☐	Q.A. data	☐
Photographs	☐	Safety analysis report	☐
Engineering/site drawings	☐	D&D report	☐
Unusual Occurrence Report	☐	Initial assessment	☐
Summary documents	☐	Well data	☐
Facility SOPs	☐	Construction data	☐
OTHER	☒ 9		

PROCESS: Shallow Injection Wells

Question 8. Is there evidence that this hazardous substance/constituent is present at the source as it exists today? If so, describe the evidence.

Block 1 Answer:

Steam Condensate

No formal evidence supports the hazardous constituent being present at the sources as they exist today. The steam and condensate lines leading to each of the SIWs have been abandoned. Conservative estimates of contaminant concentration are less than risk-based levels.

Fuel Oil Contamination

Visual inspection confirms the fuel oil contamination is still present in SIW CPP-107. Sample results indicate that the risk-based concentration levels from EPA Region 9 Preliminary Remediation Goals for soil screening are exceeded, but the 1E-04 risk-based level, consistent with the OU 3-13 ROD risk level, are not exceeded for the fuel oil contaminants.

Block 2 How reliable are the information sources? ☒ High ☐ Med ☐ Low (check one) Explain the reasoning behind this evaluation.

Engineering drawings document the abandonment or grouting of condensate lines running to the shallow injection wells. Further, interviews with personnel intimately familiar with the decommissioning of the facilities confirm the current status of the condensate lines.

Block 3 Has this INFORMATION been confirmed? ☒ Yes ☐ No (check one) If so, describe the confirmation.

The information regarding the sources of the condensate is well documented and is therefore considered highly reliable.

The information from the soil samples obtained from the SIW is documented in the report "WGS-031-01 Petroleum Contaminated Soil at CPP-701".[15]

Block 4 Sources of Information [check appropriate box(es) & source number from reference list]

No available information	☐	**Analytical data**	☒ **15**
Anecdotal	☐	**Documentation about data**	☐
Historical process data	☐	**Disposal data**	☐
Current process data	☐	**Q.A. data**	☐
Photographs	☐	**Safety analysis report**	☐
Engineering/site drawings	☐	**D&D report**	☐
Unusual Occurrence Report	☐	**Initial assessment**	☐
Summary documents	☐	**Well data**	☐
Facility SOPs	☐	**Construction data**	☐
OTHER	☐		

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1. DEQ, 2003, Response to INEEL Shallow Injection Well Abandonment Plan, State of Idaho Department of Water Resources, CCN 39827, January 21, 2003

2. DOE-ID, 1997, *Comprehensive Facility and Land Use Plan*, DOE/ID-10514, Rev. 0, U.S. Department of Energy Idaho Operations Office, December 1997.

3. INEEL, 2003, *CPP-701 Fuel Oil Storage Area Risk-Based Corrective Action Tier 2 Analysis for Petroleum Contaminated Soils,* Idaho National Engineering and Environmental Laboratory, August 2003.

4. INEEL, 2003, *CPP-701 Fuel Oil Storage Area Risk-Based Corrective Action Tier 2 Analysis for Petroleum Contaminated Soils,* Idaho National Engineering and Environmental Laboratory, August 2003.

5. Varvel, Mark, Memo with Terry Chesnovar, INTEC Boiler System Support Engineer, November 20, 2003

6. Interview Memo with Sandra Carnahan, INTEC Water Boiler System Support Engineer, March 27, 2003.

7. EPA, Region 9 Preliminary Remediation Goals, 2002 Tables, [Electronic database]. 2002. U.S. Environmental Protection Agency. Available: http://www.epa.gov/region09/waste/sfund/prg/index.htm

8. Bragassa, Jodi, Personal Communication with Terry Chesnovar, INTEC Boiler System Engineer, November 13, 2003.

9. INEEL, 2003, *CPP-701 Fuel Oil Storage Area Risk-Based Corrective Action Tier 2 Analysis for Petroleum Contaminated Soils,* Idaho National Engineering and Environmental Laboratory, August 2003.

10. INEEL, 2003, *CPP-701 Fuel Oil Storage Area Risk-Based Corrective Action Tier 2 Analysis for Petroleum Contaminated Soils,* Idaho National Engineering and Environmental Laboratory, August 2003.

11. INEEL Environmental Data Warehouse, [Electronic database]. 2003. INEEL intranet. Available: http://icpweb2/edw2/

12. ABE Volume Calculator, [Electronic database]. 2004. Mississippi State University, Agricultural and Biological Engineering. Available: http://grapevine.abe.msstate.edu/~fto/tools/vol/index.html

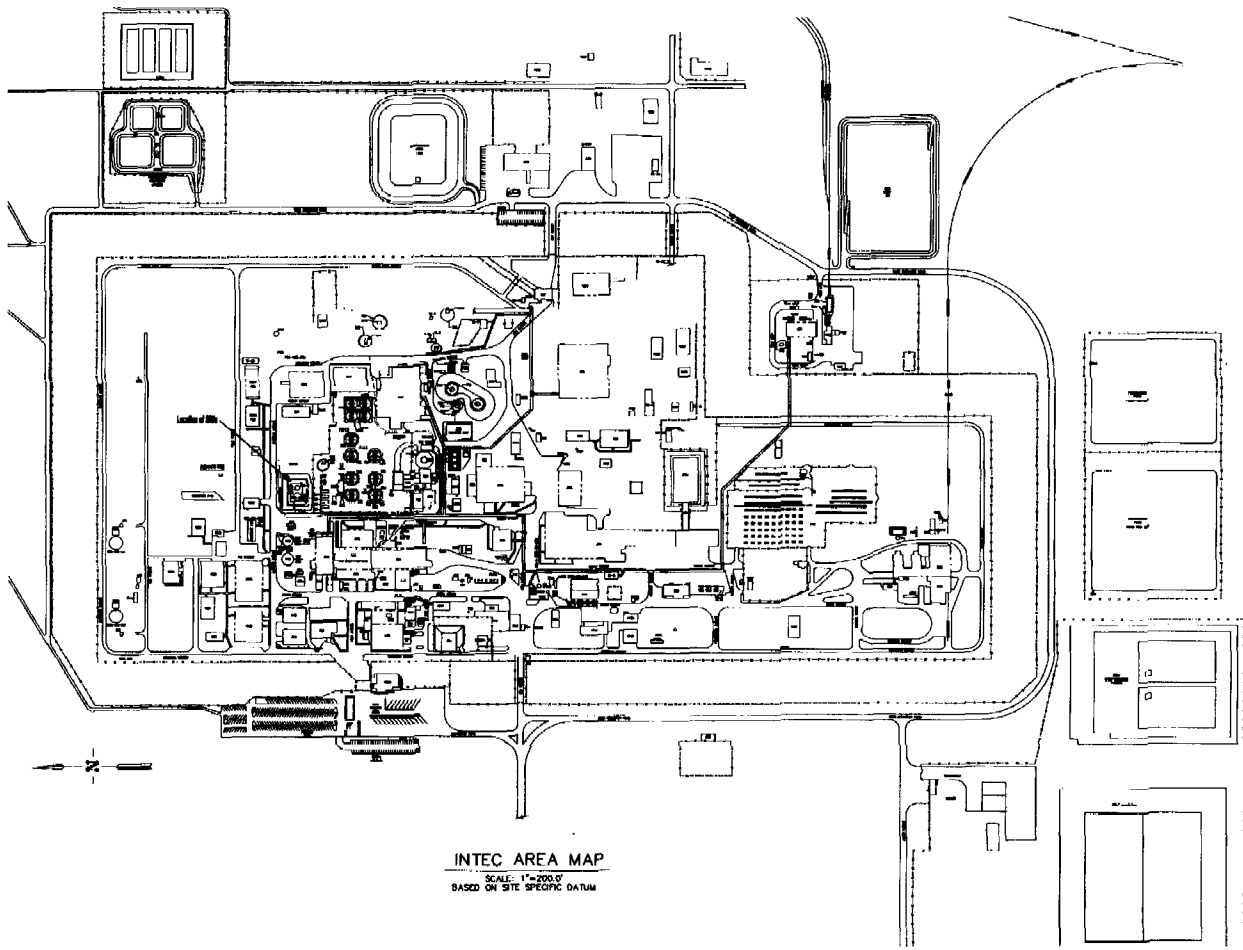
13. The MERCK Index, 12th Edition, Merck & Co., Inc., Whitehouse Station, NJ 1996

14. Bragassa, Jodi, Memo with Terry Chesnovar, INTEC Boiler System Support Engineer, January 8, 2004

15. INEEL, 2003, *WGS-031-01 Petroleum Contaminated Soil At CPP-701,* Idaho National Engineering and Environmental Laboratory, May 2003

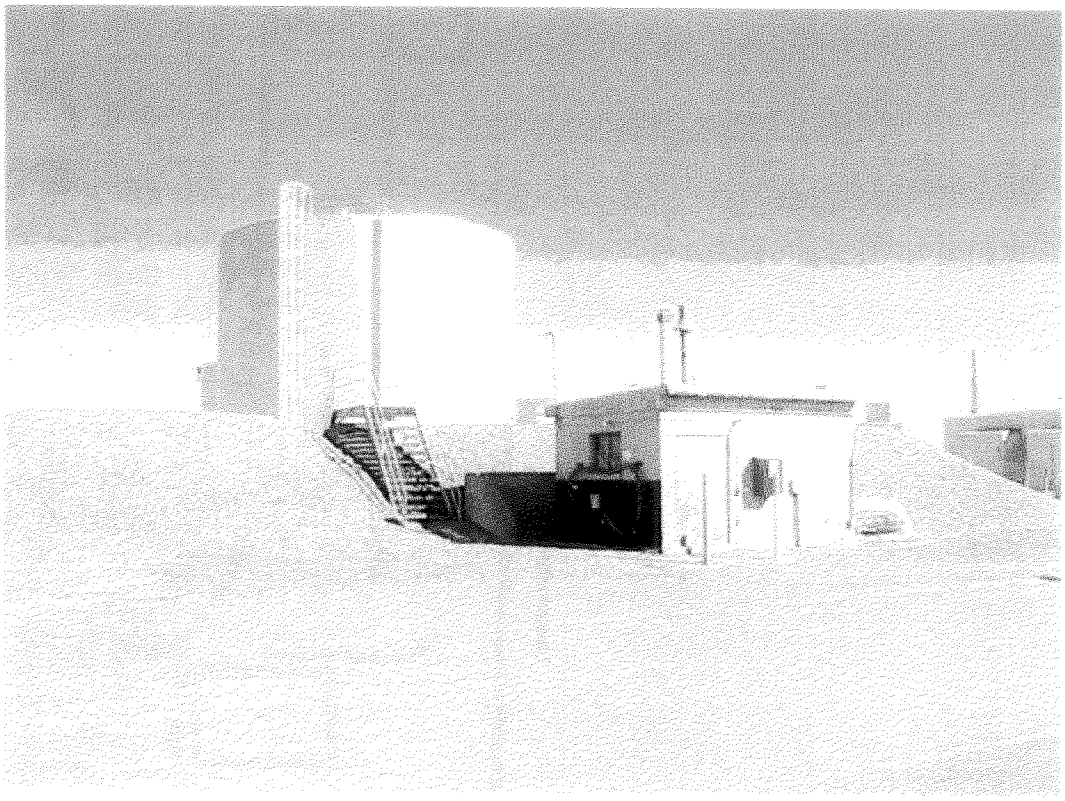
Attachment 1

Locations of the Shallow Injection Wells at INTEC



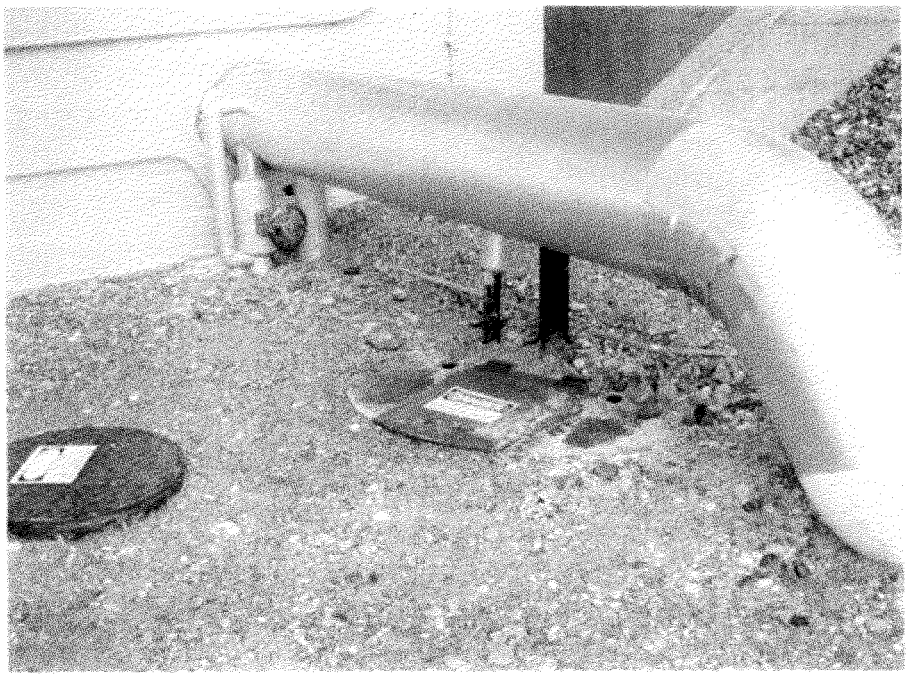
Attachment 2

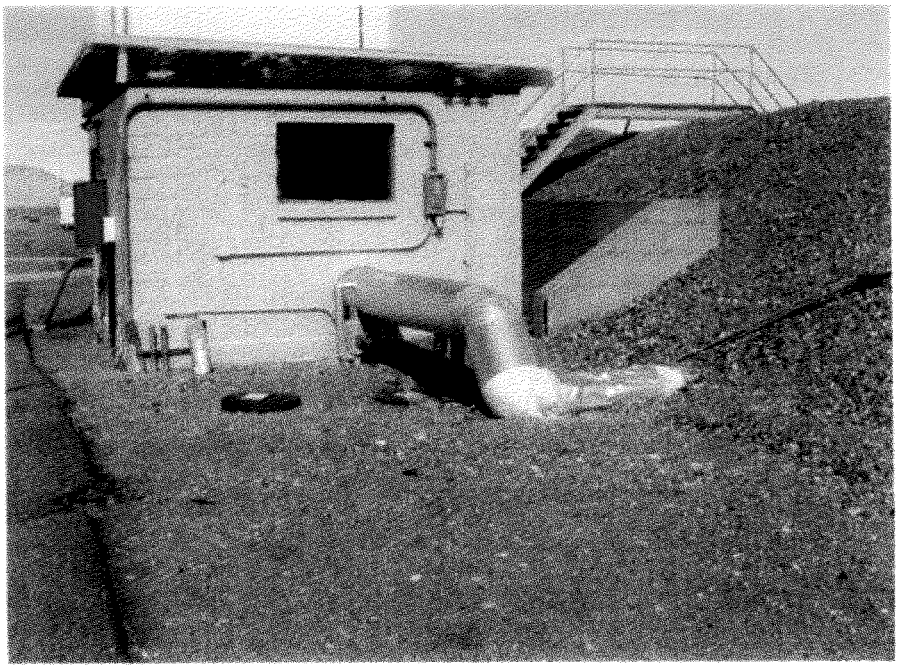
Fuel Transfer Pump Shelter (INTEC/CPP-701) and the Fuel Oil Storage Tanks



Attachment 3

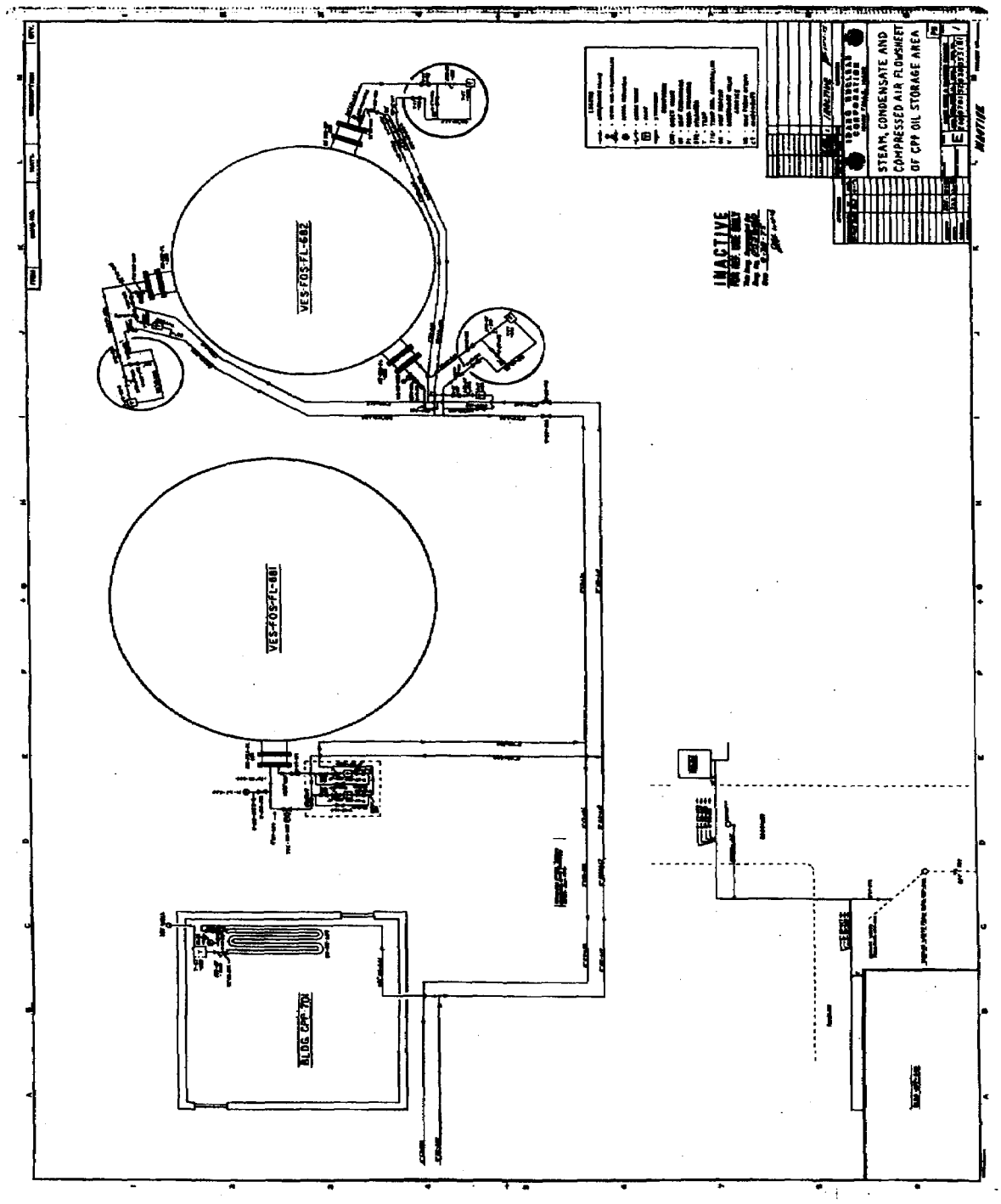
Photos of Shallow Injection Well CPP-104





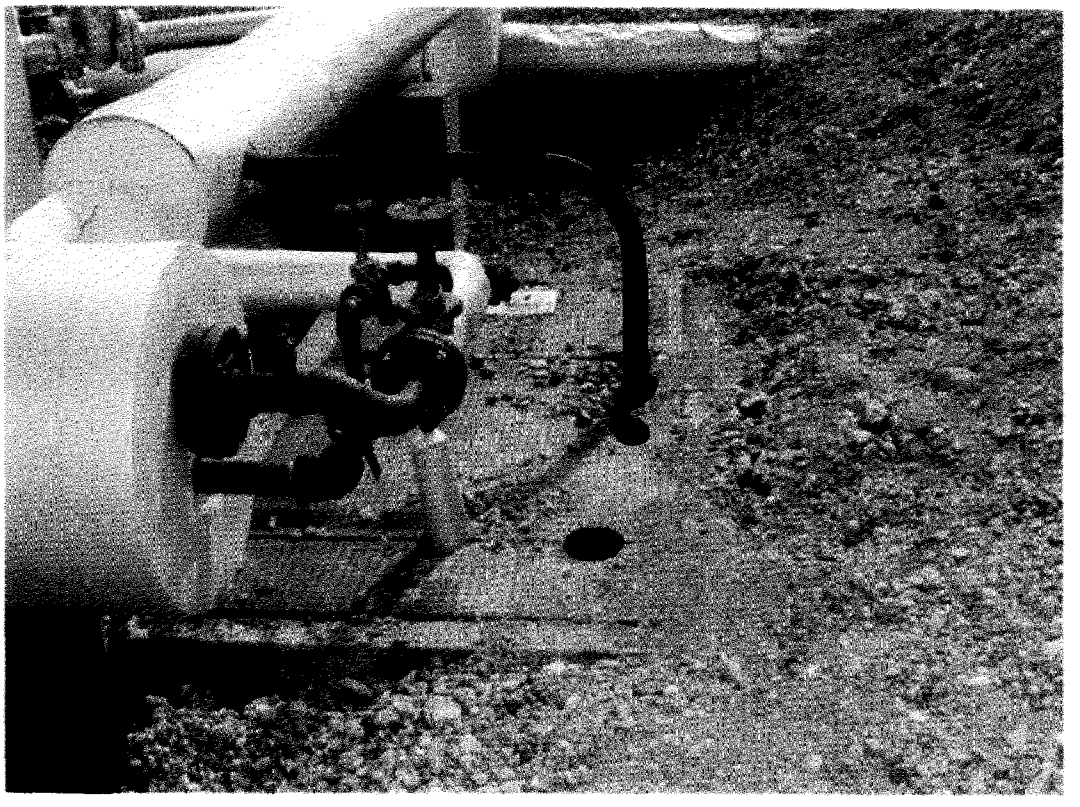
Attachment 4

Drawing 055181 of the Steam Condensate and Compressed Air Flowsheet of CPP Oil Storage Area



Attachment 5

Photo of Shallow Injection Well CPP-105

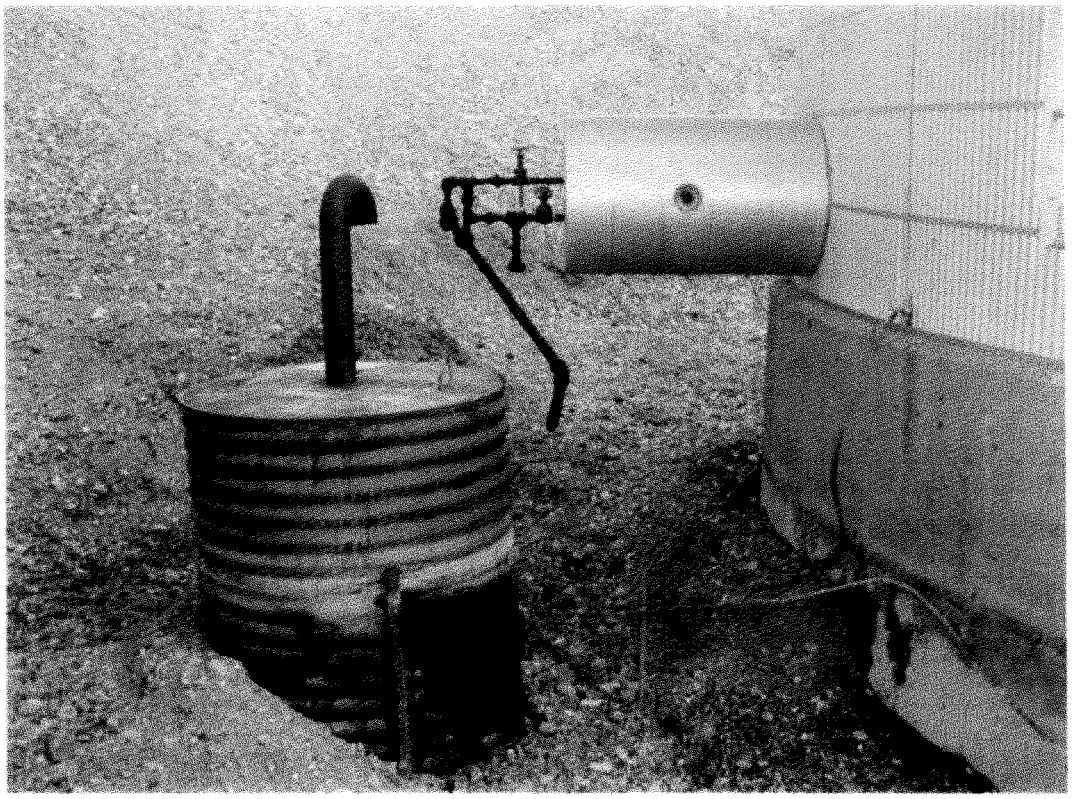


Attachment 6

Photo of Shallow Injection Well CPP-106

Attachment 7

Photo of Shallow Injection Well CPP-107



Attachment 8

Photo of Shallow Injection Well CPP-108

Attachment 9

Personal Communication with Terry Chesnovar, INTEC Boiler System Engineer

Chemical Inhibitors used in Boiler System near INTEC CPP-701

Interviewers:	Interviewee:	Date:
Jodi Bragassa & Lee Tuott	Terry Chesnovar	3/18/03

1. *Describe your association with the CPP-701 facility and boiler system.*

An engineer at the INTEC facility. Worked with the boiler system since the early 1980s.

2. *What chemicals are you aware of that were used as chemical inhibitors in the boiler system?*

The product names have changed through the years, but the constituents have not changed significantly since working with the system. The main ingredient used prior to his service was trisodium phosphate. The following products are currently used in the system and could be in the steam condensate: Amersite 2 (corrosion inhibitor); Advantage Plus 1400 (deposit inhibitor); and Amercor 1848 (corrosion inhibitor).

3. *Were chromates used, to your knowledge, in the system?*

To the best of his knowledge, no chromates were used in the boiler and steam system at INTEC.

4. *Was there any other constituent used in the boiler system that would be of significance other than those listed above?*

No.

Attachment 10

Personal Communication with Ron Garton, INTEC Boiler System Engineer

Chemical Inhibitors used in Boiler System near INTEC CPP-701

Interviewers:	Interviewee:	Date:
Jodi Bragassa	Ron Garton	3/18/03

6. Describe your association with the CPP-701 facility and boiler system.

Started working at the INEEL in 1983. He was a utilities foreman for 18 years and has been the Steam and Condensate Engineer at INTEC for the last 2 years.

7. What chemicals are you aware of that were used as chemical inhibitors in the boiler system?

The ingredient used prior to his service was trisodium phosphate. During the early 1980s a new contract was put into place and different products were used, but primarily they all contained essentially the same constituents and the products currently used. The products currently being used include: Amersite 2 (corrosion inhibitor and oxygen scavenger); Advantage Plus 1400 (deposit inhibitor) is used along with trisodium phosphate; and Amercor 1848 (corrosion inhibitor) for the steam line.

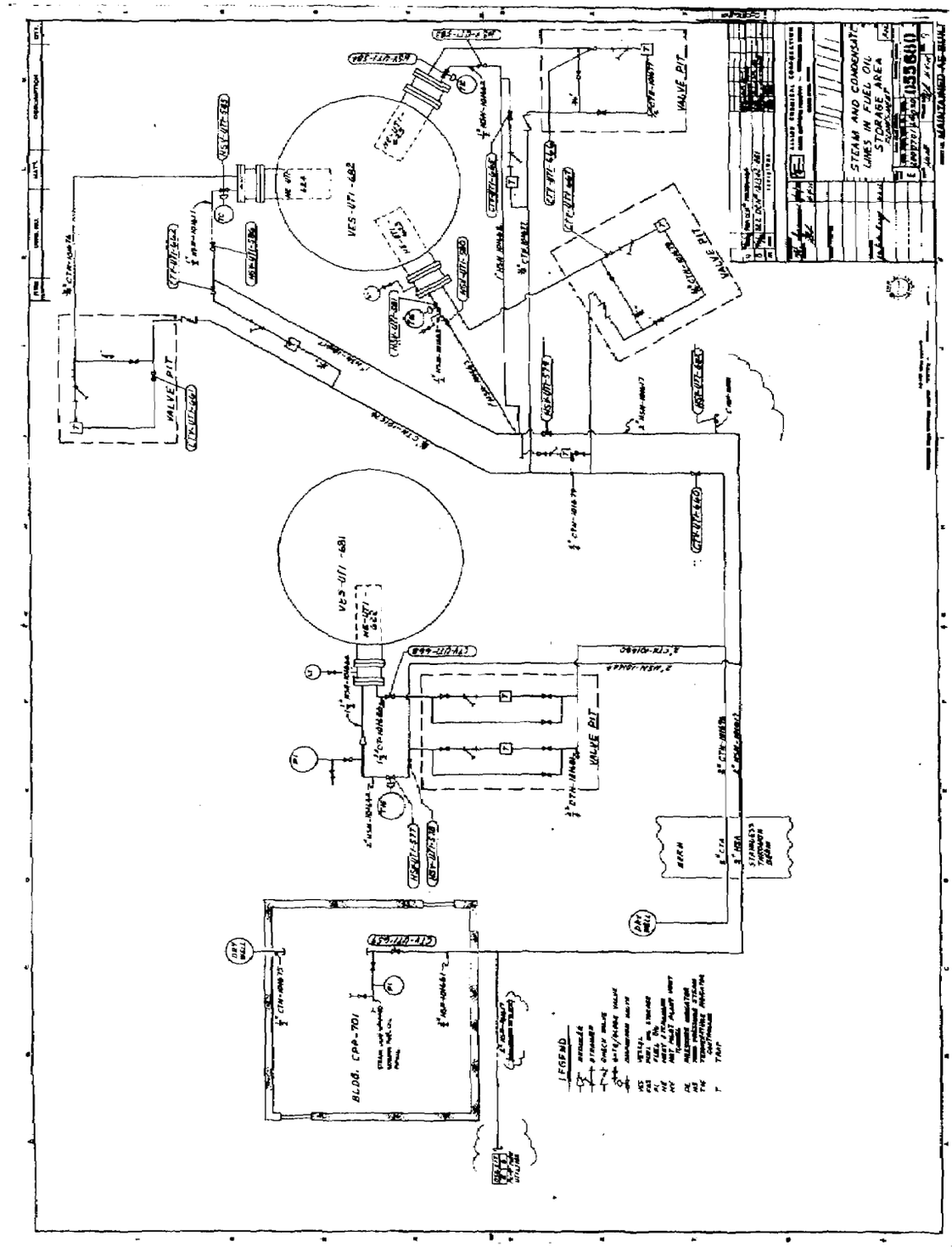
8. Were chromates used, to your knowledge, in the system?

He is not aware of any chromates being used in the system.

9. Was there any other constituent used in the boiler system that would be of significance other than those listed above?

No

Attachment 11
Drawing 055680 - Steam and Condensate Lines in Fuel Oil Storage Area



Attachment 12

Material Safety Data Sheets for Amercor 1848 Corrosion Inhibitor, Amersite 2 Corrosion Inhibitor, and Advantage Plus 1400 Deposit Inhibitor

MATERIAL SAFETY DATA SHEET

Ashland

Date Prepared: 05/01/01
Date Printed: 04/06/02
MSDS No: 999.0275688-003.003

ADVANTAGE PLUS 1400 DEPOSIT INHIBITOR

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity
Product Name: ADVANTAGE PLUS 1400 DEPOSIT INHIBITOR
Product Code:

Company
Ashland
Ashland Distribution Co. &
Ashland Specialty Chemical Co.
P. O. Box 2219
Columbus, OH 43216
614-790-3333

Emergency Telephone Number:
1-800-ASHLAND (1-800-274-5263)
24 hours everyday

Regulatory Information Number:
1-800-325-3751

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient(s)	CAS Number	% (by weight)
ETHYLENEDIAMINE TETRAACETIC ACID NA SALT	64-02-8	1.0- 10.0
ACRYLIC POLYMER		1.0- 10.0
SODIUM LIGNOSULFONATE	8061-51-6	1.0- 10.0
ORGANIC SALT		1.0- 10.0

3. HAZARDS IDENTIFICATION

Potential Health Effects

Eye
Can cause permanent eye injury. Symptoms include stinging, tearing, redness, and swelling of eyes. Can injure the cornea and cause blindness.

Skin
Can cause permanent skin damage. Symptoms may include redness, burning, and swelling of skin, burns, and other skin damage. Additional symptoms of skin contact may include: allergic skin reaction (delayed skin rash which may be followed by blistering, scaling and other skin effects) Passage of this material into the body through the skin is possible, but it is unlikely that this would result in harmful effects during safe handling and use.

Swallowing
Swallowing this material may be harmful or fatal. Symptoms may include severe stomach and intestinal irritation (nausea, vomiting, diarrhea), abdominal pain, and vomiting of blood. Swallowing this material may cause burns and destroy tissue in the mouth, throat, and digestive tract. Low blood pressure and shock may occur as a result of severe tissue injury.

Inhalation
It is possible to breathe this material under certain conditions of handling and use (for example, during heating, spraying, or stirring). Breathing this material may be harmful or fatal.

Continued on next page

DC41602

Symptoms of Exposure
Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways).

Target Organ Effects
No data

Developmental Information
This material (or a component) has been shown to cause birth defects in laboratory animal studies. Harm to the fetus occurs only at exposure levels that harm the pregnant animal. The relevance of these findings to humans is uncertain.

Cancer Information
There is no information available. The chance of this material causing cancer is unknown. This material is not listed as a carcinogen by the International Agency for Research on Cancer, the National Toxicology Program, or the Occupational Safety and Health Administration.

Other Health Effects
No data

Primary Route(s) of Entry
Inhalation, Skin absorption, Skin contact, Eye contact, Ingestion.

4. FIRST AID MEASURES

Eyes
If material gets into the eyes, immediately flush eyes gently with water for at least 15 minutes while holding eyelids apart. If symptoms develop as a result of vapor exposure, immediately move individual away from exposure and into fresh air before flushing as recommended above. Seek immediate medical attention.

Skin
Immediately flush skin with water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention. Wash clothing before reuse and discard contaminated shoes.

Swallowing
Seek immediate medical attention. Do not induce vomiting. Vomiting will cause further damage to the mouth and throat. If individual is conscious and alert, immediately rinse mouth with water and give milk or water to drink. If possible, do not leave individual unattended.

Inhalation
If symptoms develop, immediately move individual away from exposure and into fresh air. Seek immediate medical attention; keep person warm and quiet. If person is not breathing, begin artificial respiration. If breathing is difficult, administer oxygen.

Continued on next page

Note to Physicians
Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: skin, lung (for example, asthma-like conditions), eye.

5. FIRE FIGHTING MEASURES

Flash Point
Not applicable

Explosive Limit
Not applicable

Autoignition Temperature
No data

Hazardous Products of Combustion
May form: carbon dioxide and carbon monoxide, sodium oxide.

Fire and Explosion Hazards
No special fire hazards are known to be associated with this product.

Extinguishing Media
regular foam, water fog, carbon dioxide, dry chemical.

Fire Fighting Instructions
Wear a self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode with appropriate turn-out gear and chemical resistant personal protective equipment. Refer to the personal protective equipment section of this MSDS.

NFPA Rating
Health - 3, Flammability - 0, Reactivity - 1

6. ACCIDENTAL RELEASE MEASURES

Small Spill
Absorb liquid on vermiculite, floor absorbent or other absorbent material. Scoop or scrape up. Put in container for recovery or disposal.

Large Spill
Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source, dike area of spill to prevent spreading, pump liquid to salvage tank. Remaining liquid may be taken up on sand, clay, earth, floor absorbent, or other absorbent material and shoveled into containers.

7. HANDLING AND STORAGE

Handling
Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed.

Continued on next page

Storage
Store in closed containers in a dry, well-ventilated area. Keep from freezing.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection
Chemical splash goggles and face shield (8" min.) in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. (Consult your industrial hygienist.)

Skin Protection
Wear resistant gloves such as: neoprene, To prevent repeated or prolonged skin contact, wear impervious clothing and boots..

Respiratory Protections
Exposures in the workplace should be monitored to determine if worker exposure to vapor or mist air concentrations exceeds the facility specified exposure "action level" or the use of the product produces adverse health effects or symptoms of exposure. Only a NIOSH/MSHA approved respirator and cartridge (TC-23C) is to be used. Monitoring results must be used to assess the proper level of respiratory protection necessary (such as: full face piece respirator with chemical cartridges or self-contained breathing apparatus (scuba), etc.). Proper engineering and/or administrative controls should be used to reduce worker exposure. The facility's respiratory protection program must meet the requirements established in 29 CFR 1910.134, which includes a program for medical evaluation.

Engineering Controls
Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below level of overexposure (from known, suspected or apparent adverse effects).

Exposure Guidelines
Component

ETHYLENEDIAMINE TETRAACETIC ACID NA SALT (64-02-8)
No exposure limits established

ACRYLIC POLYMER
No exposure limits established

SODIUM LIGNOSULFONATE (8061-51-6)
No exposure limits established

ORGANIC SALT
No exposure limits established

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point
(for component) 212.0 F (100.0 C) @ 760 mmHg

Continued on next page

Vapor Pressure
(for component) 17.500 mmHg @ 68.00 F

Specific Vapor Density
No data

Specific Gravity
1.120 @ 68.00 F

Liquid Density
9.330 lbs/gal @ 68.00 F
1.120 kg/l @ 20.00 C

Percent Volatiles
70.0 - 85.0 %

Volatile Organic Compounds (VOC)
.000 %
.000 g/l
.000 lbs/gal

Evaporation Rate
< 1.00

Appearance
DARK BROWN LIQUID

State
LIQUID

Physical Form
HOMOGENEOUS SOLUTION

Color
DARK BROWN

Odor
NOT DETERMINED

pH
13.0

Freezing Point
28.0 F (-2.2 C)

Octanol/Water Partition Coefficient
> 1.000

10. STABILITY AND REACTIVITY

Hazardous Polymerization
Product will not undergo hazardous polymerization.

Continued on next page

Hazardous Decomposition
May form: carbon dioxide and carbon monoxide, sodium oxide.

Chemical Stability
Stable.

Incompatibility
Avoid contact with: copper, reactive metals such as aluminum and magnesium, strong mineral acids, strong oxidizing agents.

11. TOXICOLOGICAL INFORMATION

LD 50 and LC 50 Data

ETHYLENEDIAMINETETRAACETATE, SODIUM SALT (CAS# 64-02-8)
Oral LD50 (male rat): 3030 mg/kg
Dermal LD50 (rabbit): >5000 mg/kg
Inhalation LC50: Not available
SODIUM LIGNOSULFONATE (CAS# 8061-51-6)
Oral LD50 (mouse): 6030 mg/kg
Dermal LD50: Not available
Inhalation LC50: Not available

12. ECOLOGICAL INFORMATION

Ecotoxicological Information
96 hour LC50 rainbow trout (static conditions): 3536.0 mg/l*
96 hour LC50 fathead minnow (static conditions): 2031.0 mg/l*
48 hour LC50 Daphnia magna (static conditions): 3536.0 mg/l*

* Based on a similar product formulation.

Chemical Fate Information
BOD5: 58 ppm*
COD: 490,000 ppm*

* Based on a similar product formulation.

13. DISPOSAL CONSIDERATION

Waste Management Information
Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution Company, IC&S Environmental Services Group at 800-637-7922.

14. TRANSPORT INFORMATION

DOT Information - 49 CFR 172.101
DOT Description:
NON-REGULATED BY D.O.T.

Continued on next page

Container/Mode:
55 GAL DRUM/TRUCK PACKAGE

NOS Component:
None

RQ (Reportable Quantity) - 49 CFR 172.101
Not applicable

Other Transportation Information
The DOT Transport Information may vary with the container and mode of shipment.

15. REGULATORY INFORMATION

US Federal Regulations

TSCA (Toxic Substances Control Act) Status
TSCA (UNITED STATES) The intentional ingredients of this product are listed.

CERCLA RQ - 40 CFR 302.4(a)
None listed

CERCLA RQ - 40 CFR 302.4(b)
This material has a RQ of 100 lbs as a D002 Corrosive unlisted hazardous substance.

SARA 302 Components - 40 CFR 355 Appendix A
None

Section 311/312 Hazard Class - 40 CFR 370.2
Immediate(X) Delayed( ) Fire( ) Reactive( ) Sudden Release of Pressure( )

SARA 313 Components - 40 CFR 372.65
None

OSHA Process Safety Management 29 CFR 1910
None listed

EPA Accidental Release Prevention 40 CFR 68
None listed

International Regulations

Inventory Status
DSL (CANADA) The intentional ingredients of this product are listed.

State and Local Regulations

California Proposition 65
None

Continued on next page

16. OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

Last page

MATERIAL SAFETY DATA SHEET

Ashland

Page 001
Date Prepared: 07/18/00
Date Printed: 07/18/00
MSDS No: 306.0137818-006.001

AMERSITE 2 CORROSION INHIBITOR

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1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity
Product Name: AMERSITE 2 CORROSION INHIBITOR
General or Generic ID: CORROSION INHIBITOR

Company
Ashland
Ashland Distribution Co. &
Ashland Specialty Chemical Co.
P. O. Box 2219
Columbus, OH 43216
614-790-3333

Emergency Telephone Number:
1-800-ASHLAND (1-800-274-5263)
24 hours everyday

Regulatory Information Number:
1-800-325-3751

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2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient(s)	CAS Number	% (by weight)
SODIUM METABISULFITE	7681-57-4	30.0- 40.0

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3. HAZARDS IDENTIFICATION

Potential Health Effects

Eye
Can cause permanent eye injury. Symptoms include stinging, tearing, redness, and swelling of eyes. Can injure the cornea and cause blindness.

Skin
May cause mild skin irritation. Symptoms may include redness and burning of skin.

Swallowing
Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful.

Continued on next page

7/6.00 DW

Inhalation
Breathing of vapor or mist is possible.

Symptoms of Exposure
Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: stomach or intestinal upset (nausea, vomiting, diarrhea) irritation (nose, throat, airways).

Target Organ Effects
No data

Developmental Information
No data

Cancer Information
No data

Other Health Effects
No data

Primary Route(s) of Entry
Inhalation, Skin contact.

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4. FIRST AID MEASURES

Eyes
If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.

Skin
Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

Continued on next page

Swallowing
Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

Inhalation
If symptoms develop, immediately move individual away from exposure and into fresh air. Seek immediate medical attention; keep person warm and quiet. If person is not breathing, begin artificial respiration. If breathing is difficult, administer oxygen.

Note to Physicians
Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: lung (for example, asthma-like conditions).

FIRE FIGHTING MEASURES

Flash Point
Not applicable

Explosive Limit
Not applicable

Autoignition Temperature
No data

Hazardous Products of Combustion
May form: sulfur dioxide.

Fire and Explosion Hazards
No special fire hazards are known to be associated with this product.

Continued on next page

Extinguishing Media
water fog, carbon dioxide.

Fire Fighting Instructions
Wear a self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode with appropriate turn-out gear and chemical resistant personal protective equipment. Refer to the personal protective equipment section of this MSDS.

NFPA Rating
Health - 2, Flammability - 0, Reactivity - 0

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6. ACCIDENTAL RELEASE MEASURES

Small Spill
Absorb liquid on vermiculite, floor absorbent or other absorbent material.

Large Spill
Prevent run-off to sewers, streams or other bodies of water. If run-off occurs, notify proper authorities as required, that a spill has occurred. Persons not wearing protective equipment should be excluded from area of spill until clean-up is completed. Stop spill at source. Dike to prevent spreading. Pump to salvage tank.

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7. HANDLING AND STORAGE

Handling
Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed.

Continued on next page

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection
Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. Consult your safety representative.

Skin Protection
Wear resistant gloves such as: neoprene, polyvinyl chloride, To prevent repeated or prolonged skin contact, wear impervious clothing and boots., Wear normal work clothing covering arms and legs..

Respiratory Protections
If workplace exposure limit(s) of product or any component is exceeded (see exposure guidelines), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your industrial hygienist). Engineering or administrative controls should be implemented to reduce exposure.

Engineering Controls
Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s).

Exposure Guidelines
Component

SODIUM METABISULFITE (7681-57-4)
OSHA VPEL 5.000 mg/m3 - TWA
ACGIH TLV 5.000 mg/m3 - TWA

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9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point
(for component) 212.0 F (100.0 C) @ 760 mmHg

Continued on next page

Vapor Pressure
(for component) 17.500 mmHg

Specific Vapor Density
> 1.000 @ AIR=1

Specific Gravity
1.300 @ 77.00 F

Liquid Density
10.800 lbs/gal @ 77.00 F
1.300 kg/l @ 25.00 C

Percent Volatiles
55.0 - 70.0

Evaporation Rate
SLOWER THAN ETHYL ETHER

Appearance
CLEAR

State
LIQUID

Physical Form
HOMOGENEOUS SOLUTION

Color
PINK

Odor
No data

pH
4.1

Freezing Point
15.0 F (-9.4 C)

Continued on next page

Solubility in Water
SOLUBLE

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10. STABILITY AND REACTIVITY

Hazardous Polymerization
Product will not undergo hazardous polymerization.

Hazardous Decomposition
May form: sulfur dioxide.

Chemical Stability
Stable.

Incompatibility
Avoid contact with: strong mineral acids, strong oxidizing agents

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TOXICOLOGICAL INFORMATION

No data

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12. ECOLOGICAL INFORMATION

No data

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13. DISPOSAL CONSIDERATION

Waste Management Information
Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution Company, IC&S Environmental Services Group at 800-637-7922.

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14. TRANSPORT INFORMATION

DOT Information - 49 CFR 172.101
DOT Description:
BISULFITES, AQUEOUS SOLUTIONS, N.O.S.,8,UN2693,III

Container/Mode:
55 GAL DRUM/TRUCK PACKAGE

NOS Component:
SODIUM BISULFITE

RQ (Reportable Quantity) - 49 CFR 172.101
Not applicable

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15. REGULATORY INFORMATION

US Federal Regulations
TSCA (Toxic Substances Control Act) Status
TSCA (UNITED STATES) The intentional ingredients of this product are listed.

CERCLA RQ - 40 CFR 302.4(a)
None listed

CERCLA RQ - 40 CFR 302.4(b)
Materials without a "listed" RQ may be reportable as an "unlisted hazardous substance". See 40 CFR 302.5 (b).

SARA 302 Components - 40 CFR 355 Appendix A
None

Section 311/312 Hazard Class - 40 CFR 370.2
Immediate(X) Delayed( ) Fire( ) Reactive( ) Sudden Release of Pressure( )

SARA 313 Components - 40 CFR 372.65
None

Continued on next page

OSHA Process Safety Management 29 CFR 1910
None listed

EPA Accidental Release Prevention 40 CFR 68
None listed

International Regulations
Inventory Status
DSL (CANADA) The intentional ingredients of this product are listed.

State and Local Regulations
California Proposition 65
The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1986: This product contains the following substance(s) known to the state of California to cause cancer.
ARSENIC
LEAD
NICKEL
COBALT METAL POWDER

The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1986: This product contains the following substance(s) known to the state of California to cause reproductive harm.
ARSENIC
LEAD

New Jersey RTK Label Information
SODIUM METABISULFITE 7681-57-4

Pennsylvania RTK Label Information
DISULFUROUS ACID, DISODIUM SALT 7681-57-4

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16. OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

MATERIAL SAFETY DATA SHEET

Ashland

Page 001
Date Prepared: 06/28/99
Date Printed: 01/29/00
MSDS No: 306.0249274-007.001

AMERCOR 1848 CORROSION INHIBITOR

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity
Product Name: AMERCOR 1848 CORROSION INHIBITOR
Product Code:
General or Generic ID: CORROSION INHIBITOR

Company
Ashland
Ashland Distribution Co. &
Ashland Specialty Chemical Co.
P. O. Box 2219
Columbus, OH 43216
614-790-3333

Emergency Telephone Number:
1-800-ASHLAND (1-800-274-5263)
24 hours everyday

Regulatory Information Number:
1-800-325-3791

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient(s)	CAS Number	% (by weight)
CYCLOHEXYLAMINE	108-91-8	10.0- 25.0
DIETHYLETHANOLAMINE	100-37-8	10.0- 25.0
MORPHOLINE	110-91-8	10.0- 25.0

3. HAZARDS IDENTIFICATION

Potential Health Effects

Eye
Can cause permanent eye injury. Symptoms include stinging, tearing, redness, and swelling of eyes. Can injure the cornea and cause blindness. Additional symptoms of eye exposure may include: halo vision (blurred vision around bright objects)

Skin
Can cause permanent skin damage. Symptoms may include redness, burning, and swelling of skin, burns, and other skin damage. Additional symptoms of skin contact may include: allergic skin reaction (delayed skin rash which may be followed by blistering, scaling and other skin effects). Passage of this material into the body through the skin is possible, and skin contact may be harmful.

Swallowing
Swallowing this material may be harmful or fatal. Symptoms may include severe stomach and intestinal irritation (nausea, vomiting, diarrhea), abdominal pain, and vomiting of blood. Swallowing this material may cause burns and destroy tissue in the mouth, throat, and digestive tract. Low blood pressure and shock may occur as a result of severe tissue injury.

Inhalation
Breathing of vapor or mist is possible. Breathing this material may be harmful. Symptoms usually occur at air concentrations higher than the recommended exposure limits (See Section 8).

Continued on next page

Symptoms of Exposure
Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), cough, headache, central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness), nervousness, muscle weakness, effects on blood pressure, chest pain effects on heart rate, loss of coordination, difficult breathing, methemoglobinemia (blood abnormality which causes a blue coloring to the skin), lung edema (fluid buildup in the lung tissue).

Target Organ Effects
Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals: mild, reversible bladder effects, liver abnormalities, effects on male fertility, nasal damage, testis damage, eye damage, kidney damage, liver damage, lung damage.

Developmental Information
This material (or a component) has been shown to cause harm to the fetus in laboratory animal studies. Harm to the fetus occurs only at exposure levels that harm the pregnant animal. The relevance of these findings to humans is uncertain.

Cancer Information
No data

Other Health Effects
This material (or a component) has been both positive and negative in tests for mutagenicity. The relevance of this finding to human health is uncertain.

Primary Route(s) of Entry
Inhalation, Skin absorption, Skin contact, Ingestion.

4. FIRST AID MEASURES

Eyes
If material gets into the eyes, immediately flush eyes gently with water for at least 15 minutes while holding eyelids apart. If symptoms develop as a result of vapor exposure, immediately move individual away from exposure and into fresh air before flushing as recommended above. Seek immediate medical attention.

Skin
Immediately flush skin with water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention. Wash clothing before reuse and discard contaminated shoes.

Swallowing
Seek immediate medical attention. Do not induce vomiting. Vomiting will cause further damage to the mouth and throat. If individual is conscious and alert, immediately rinse mouth with water and give milk or water to drink. If possible, do not leave individual unattended.

Continued on next page

Large Spill
Eliminate all ignition sources (flares, flames including pilot lights, electrical sparks). Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source. Prevent from entering drains, sewers, streams or other bodies of water. Prevent from spreading. If runoff occurs, notify authorities as required. Pump or vacuum transfer spilled product to clean containers for recovery. Absorb unrecoverable product. Transfer contaminated absorbent, soil and other materials to containers for disposal. Prevent run-off to sewers, streams or other bodies of water. If run-off occurs, notify proper authorities as required, that a spill has occurred.

7. HANDLING AND STORAGE

Handling
Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed. All five-gallon pails and larger metal containers, including tank cars and tank trucks, should be grounded and/or bonded when material is transferred. Do not use sodium nitrite or other nitrosating agents in formulations containing this product. Suspected cancer-causing nitrosamines could be formed.

Storage
Keep from freezing.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection
Chemical splash goggles and face shield (8" min.) in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. (Consult your industrial hygienist.)

Skin Protection
Wear resistant gloves such as: natural rubber, nitrile rubber, To prevent skin contact, wear impervious clothing and boots., Other protective equipment: eyewash station, emergency shower..

Respiratory Protections
Exposures in the workplace should be monitored if worker exposure to vapor or mists exceeds the PEL or TLV. Only a NIOSH/MSHA approved respirator and cartridge (TC-23C) is to be used. Monitoring results must be used to assess the proper level of respiratory protection necessary (such as: full face piece respirator with chemical cartridges or self-contained breathing apparatus (scuba), etc.). Proper engineering and/or administrative controls should be used to reduce worker exposure. The facility's respiratory program must meet the requirements established in 29 CFR 1910.134, which includes a program for medical evaluation.

Engineering Controls
Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below level of overexposure (from known, suspected or apparent adverse effects).

Continued on next page

Exposure Guidelines
Component

CYCLOHEXYLAMINE (108-91-8)
OSHA VPEL 10.000 ppm - TWA
ACGIH TLV 10.000 ppm - TWA

DIETHYLETHANOLAMINE (100-37-8)
OSHA VPEL 10.000 ppm - TWA (Skin)
ACGIH TLV 2.000 ppm - TWA (Skin)

MORPHOLINE (110-91-8)
OSHA VPEL 20.000 ppm - TWA (Skin)
OSHA VPEL 30.000 ppm - STEL (Skin)
ACGIH TLV 20.000 ppm - TWA (Skin)
ACGIH TLV 30.000 ppm - STEL (Skin)

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point
(for component) 212.0 F (100.0 C) @ 760 mmHg

Vapor Pressure
(for component) 17.500 mmHg @ 68.00 F

Specific Vapor Density
1.000 @ AIR=1

Specific Gravity
.970 @ 77.00 F

Liquid Density
8.089 lbs/gal @ 77.00 F
.970 kg/l @ 25.00 C

Percent Volatiles
100.0 %

Evaporation Rate
SLOWER THAN ETHYL ETHER

Appearance
CLEAR TO LIGHT AMBER LIQUID

State
LIQUID

Physical Form
No data

Color
CLEAR TO LIGHT AMBER

Continued on next page

Odor
No data

pH
12.5

Freezing Point
-29.0 F (-33.8 C)

10. STABILITY AND REACTIVITY

Hazardous Polymerization
Product will not undergo hazardous polymerization.

Hazardous Decomposition
May form: carbon dioxide and carbon monoxide, nitrogen compounds, various hydrocarbons.

Chemical Stability
Stable.

Incompatibility
Avoid contact with: excessive heat, strong acids, strong oxidizing agents, temperature extremes.

11. TOXICOLOGICAL INFORMATION

No data

12. ECOLOGICAL INFORMATION

Ecotoxicological Information
96 hour LC50 rainbow trout (static conditions): 7071.1 mg/l
96 hour LC50 fathead minnow (static conditions): 947.3 mg/l
48 hour LC50 Daphnia magna (static conditions): 883.9 mg/l

Chemical Fate Information
BOD5: 1,170,000 mg/l
COD: 1,185,000 mg/l

13. DISPOSAL CONSIDERATION

Waste Management Information
Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution Company, IC&S Environmental Services Group at 800-637-7922.

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14. TRANSPORT INFORMATION

DOT Information - 49 CFR 172.101

DOT Description:
AMINES, FLAMMABLE, CORROSIVE, N.O.S.,3,UN2924,III

Container/Mode:
55 GAL DRUM/TRUCK PACKAGE

NOS Component:
CYCLOHEXYLAMINE
MORPHOLINE

RQ (Reportable Quantity) - 49 CFR 172.101
Not applicable

15. REGULATORY INFORMATION

US Federal Regulations

TSCA (Toxic Substances Control Act) Status
TSCA (UNITED STATES) The intentional ingredients of this product are listed

CERCLA RQ - 40 CFR 302.4(a)
None listed

CERCLA RQ - 40 CFR 302.4(b)
Materials without a "listed" RQ may be reportable as an "unlisted hazardous substance". See 40 CFR 302.5 (b).

SARA 302 Components - 40 CFR 355 Appendix A

Section 302 Component(s)	TPQ (lbs)	RQ (lbs)
CYCLOHEXYLAMINE	10000	10000

Section 311/312 Hazard Class - 40 CFR 370.2
Immediate(X) Delayed(X) Fire(X) Reactive( ) Sudden Release of Pressure( )

SARA 313 Components - 40 CFR 372.65
None

OSHA Process Safety Management 29 CFR 1910
None listed

EPA Accidental Release Prevention 40 CFR 68

RMP Component (s)	Condition	TQ (lbs)
CYCLOHEXYLAMINE `CYCLOHEXANAMINE		15000

International Regulations

Inventory Status
Not determined

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State and Local Regulations

California Proposition 65

None

New Jersey RTK Label Information

CYCLOHEXYLAMINE	108-91-8
DIETHYLAMINOETHANOL	100-37-8
MORPHOLINE	110-91-8

Pennsylvania RTK Label Information

CYCLOHEXANAMINE	108-91-8
ETHANOL, 2-(DIETHYLAMINO)-	100-37-8
MORPHOLINE	110-91-8

16. OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

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